

Validation Report
for
Application Protocol 210:
Printed circuit assembly product design data
(ISO 10303-210)

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March 31, 1994 -- ISO CD Release

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1.0 VALIDATION PLAN

1.1 Prologue

The objective of the STandard for the Exchange of Product model data (STEP) is to provide a complete, unambiguous, computer-interpretable definition of the physical and functional characteristics of a product throughout its life cycle. The STEP standard is a collection of Parts grouped into several classes which include Integrated Resources (IRs) and Application Protocols (APs). An AP provides a scope and a context for the general-purpose constructs defined in the IRs.

The entire set of STEP standards is called ISO 10303 Industrial Automation Systems: STEP. It is a draft international standard under the development of the International Organization for Standardization (ISO) technical committee 184 (TC184) sub-committee 4 (SC4). Specifically, the STEP Application Protocol 210 (**AP210 Printed circuit assembly product design data**, ISO 10303-210, specifies the requirements for the exchange of electrical printed circuit assembly (PCA) design information. It is developed by the **PDES, Inc. electrical and electronics (PIEE)** project team.

1.2 Validation Approaches

AP210 has been subjected to validation testing in each development phase to ensure that the scope and requirements are sufficiently covered within the AP. The AP210 validation uses the following approaches:

1. In-process validation. Validation goes hand in hand with the model development process. It therefore serves as a built-in check to the model under development.
2. Validation with related parties. Periodic status updates, model walk-through's, workshops, and demonstrations are made for PIEE member companies, International Organization for Standardization (ISO) which sponsors the STEP standard, International Electrotechnical Commission (IEC), and IGES/PDES Organization (IPO) which coordinates Initial Graphics Exchange Specification (IGES) and Product Data Exchange using STEP (PDES) standard-making activities.
3. Validation with external parties. Existing EE-standard organizations and EE/computer-aided-design (CAD) vendors are encouraged to provide input to AP210 during its development. Examples are American National Standards Institute (ANSI) Harmonization Workshops, Electronics Industries Association (EIA), etc.

1.3 Validation Categories

The validation activities and results are documented following their completion. At this writing, the first two AP validation categories are substantially complete while others are partially done:

1. **Scope and requirements evaluation.** The purpose is to determine the proper context, scope, and information requirements by validating the **Application Activity Model (AAM)** and **Data Planning Model (DPM)**.
2. **Application Reference Model (ARM) validation.** The purpose is to determine the completeness and correctness of the information requirements of the ARM which should correspond to the scope defined in AAM and DPM.
3. **Integrated Resources (IR) interpretation.** The purpose is to determine how existing Integrated Resources among STEP APs are applied to meet specific information requirements of AP210.
4. **Application Interpreted Model (AIM) validation.** The purpose is to verify that each information requirement in the ARM is correlated and represented in the AIM.
5. **Conformance requirements & test guidance evaluation.** The purpose is to verify that each substantial requirement defined in the ARM has at least one abstract test suite developed against it and that valid data can meet conformance requirements and classes within specified constraints.
6. **AP validation with prototype implementation.** The prototype is used to demonstrate how printed circuit assembly (PCA) design information can actually be exchanged through AP210 among electronic computer-aided design (ECAD) systems for design and manufacturing purposes.

2.0 SCOPE AND REQUIREMENTS EVALUATION (AAM & DPM)

The first phase of AP210 includes the development of the **Application Activity Model (AAM)** followed by the **Data Planning Model (DPM)**. The AAM is used to document the printed circuit assembly (PCA) process to identify which activities and associated input, control, output and mechanism (ICOMs) should be within the scope of AP210. A DPM is then formed by grouping these ICOMs into major categories according to domain information requirements and by denoting their correlation to each other.

2.1 In-Process Validation of AAM

In the AAM the entire process of functional decomposition, printed circuit physical design, and printed circuit assembly (PCA) manufacturing was synthesized into a perspective of information and activity flow. The portion of the process that falls within the scope of AP210 was further decomposed and analyzed. The ICOMs required for each level of activities were identified and defined. To gain early industry participation and acceptance the validation process frequently occurred in parallel with the development process as follows:

1. Adoption of Institute for Interconnecting and Packaging Electronics Circuits (IPC) Terminology. Instead of redefining those terms that are widely used in the industry, whenever possible AP210 adopts comparable terms and definitions from IPC-T-50E Terms and Definitions for Interconnecting and Packaging Electronic Circuits, which is published by the (IPC) and already has industry-wide acceptance. This was done with full knowledge and support of the IPC technical director.
2. Liaison with PDES Application Protocol for Electronics (PAP-E) project. The AAM was presented to the PAP-E project team. The design process described in the AAM was deemed to be compatible with theirs. Periodic joint meetings were held to share information on each other's development.
3. Collaboration with the PreAmp project. AP210 focuses on the exchange of PCA design data between engineering and manufacturing. AP220 focuses on the exchange of process planning information between manufacturing and production. The goal of the PreAmp project team is to generate PCA process planning and manufacturing information from AP210 and AP220. AP210 and AP220 are validated by PreAmp's successful prototype implementation in an actual PCA manufacturing environment.

2.2 Application Expert Workshops (AEW)

A series of AEWs were held at the following PIEE member companies for AAM validation:

Hughes Aircraft Co.	Fullerton, CA	910427
Rockwell International	Anaheim, CA Cedar Rapids, IA	920428 920818
Naval Air Warfare Center	Indianapolis, IN	920715
Digital Equipment Corp.	Marlboro, MA	920428
Sandia National Lab.	Albuquerque, NM	920511
Boeing	Seattle, WA	920519
Hewlett-Packard	Palo Alto, CA	920520

In-depth discussions of the Electrical Engineering (EE) design and manufacturing process were conducted in these workshops. PCA design, the scope of AP210, was targeted, decomposed, and examined in detail. The ICOMs were studied and suggestions were incorporated into the AAM.

2.3 Validation of DPM

The ICOMs were identified and grouped through the AAM. From them, the scope, major information categories, and their correlations were derived and expressed in terms of the **Data Planning Model (DPM)**. The development and validation of the DPM was an iterative process. As the subsequent ARM was developed based on the DPM and the AAM-to-ARM mapping table (see Appendix), the DPM was further reviewed and refined to correspond with the **units of functionality (UoF)** of the ARM. The DPM was validated by the synchronization of the AAM and ARM.

The DPM and the units of functionality in the ARM were used to present a high level view of AP210 to outside parties interested in developing vendor-specific ECAD-to-AP210 translators for standardized PCA data exchange. Specific examples are:

1. Meeting with Application Specific Electronics Module Computer Aided (ASEM CAX) Alliance in Austin, Texas on December 16-17, 1993. The ASEM CAX Alliance is a program funded by the DoD Advanced Research Projects Agency (ARPA). It is led by Microelectronics & Computer Technology Corporation (MCC). Organizations participating include U.S. Air Force, Texas Instruments, Harris Corporation (owner of Scicards), Racal-Redac Systems Ltd., Cadence, IBM Corporation, and Motorola.
2. Meeting with two representatives from Cadence and sixteen representatives from Digital Equipment in Marlboro, Massachusetts on February 18, 1994.

3. Meeting with IBM, a PDES, Inc. member, in Austin, TX on 17 March 1994.

In all cases, the DPM was used to represent the kind of information that would be incorporated in the AP210 ARM. Detailed questions were discussed and answered. Suggestions were incorporated into the model development. All of these served as a check that the information categories included will satisfy the initial expectations of the potential users.

3.0 ARM VALIDATION

3.1 In-Process Collaboration with Other Standards

The PIEE team has incorporated input and feedback from various standards-making organizations during the development phase of AP210. The information collected from external sources has validated the development of AP210. This includes the following:

1. Reference to Electronic Design Interchange Format (EDIF) standard. EDIF is a design data exchange standard used extensively in the electronic design automation (EDA) industry for the exchange of data between computer aided engineering and design systems (CAE/CAD). It is a product of international joint development between the EDA industry and universities under the sponsorship of the Electronic Industries Association (EIA). The goal is to combine the extensive descriptive capabilities of EDIF in electronic design data and STEP in product life-cycle data.
 - a. Reference to EDIF Conceptual Model of a PCB (EDIF PCB) version 9. In the beginning of ARM development the EDIF PCB model was used as a reference to articulate requirements for two units of functionality, namely printed circuit board and printed circuit assembly. They were evolved to the present form through other deliberations.
 - b. EDIF-PIEE Joint Agreement. During the Design Automation Conference (DAC) held in June 1992 in Anaheim, California, USA, PIEE and EDIF announced a joint agreement to work together on PCA design and manufacturing standards based on the EDIF Information Models.
 - c. Critique from EDIF. Key EDIF personnel are on the distribution list for major AP210 releases for their critique. On 7-8 October 1993 members of IEC/TC93/WG1 who were also representatives from EDIF, PAP-E, and PIEE convened at University of Manchester, England which is the major EDIF development centre. Suggestions from this meeting were incorporated into AP210 models.
2. Adoption of IPC terminology. From the beginning of ARM development IPC terms were used whenever possible. The intention is to adopt those terms and associated concepts that have wide industry acceptance and unambiguous meanings. An IPC technical representative has frequently participated in the ARM development sessions during the development stage.
3. Reference to Cal-Poly Layered Electrical Product (LEP). The LEP model has some degree of acceptance among the IGES community and meets the MIL-D-28000 Class III (electrical) standard. Two members of the ARM development team were members of the Cal-Poly LEP team. Some LEP concepts such as stratum were used in the draft ARM.

4. Critique from Racal-Redac Systems Ltd. A technical representative from Racal-Redac Systems, Ltd. who has in-depth knowledge of Racal-Redac Systems Ltd's and EDIF's information models frequently participates in the AP210 model development sessions and provided critique.
5. Co-development with Pre-competitive Advanced manufacturing program (PreAmp). The PreAmp project focuses on the PCA product information to be shared between process planning and manufacturing operations. The product data passed to PreAmp originates from an ECAD system which translates to AP210 and then to AP220. PreAmp serves as a check and validation of the AP210 ARM.
6. Cooperation with PAP-E (AP211).
7. Cooperation with AP212 (Electrotechnical plants).
8. Cooperation with Cad Framework Initiative Component Information Representation project (CFI CIR).
9. Cooperation with IEC TC3 & ISO TC184/SC4/WG2.

3.2 Review with Other Parties

1. Model walk-through with ISO. PIEE representatives have been attending the International Standard Organization (ISO) quarterly meetings to provide updated ARM model walk-through's to international EE domain experts. These include:

ISO Location	Torino, Italy
Period	17/Feb/1993-26/Feb/1993
Audience	ISO TC184/SC4 -- JWG9, WG2
Organizations represented	<ul style="list-style-type: none"> * Institute for Machine Tools & Mfg, Swiss Fed Inst of Technology, Zurich * ATG of EDS, MI, USA * Institut fur Maschinenwesen der Technischen Universitat Clausthal, Clausthal-Zellerfeld, Germany * Nippon Computer Graphics Asso., Japan * Pentel, Soka city, Japan * Newport News Shipbuilding, USA * Ecole Nationale Superieure de Mecanique et d'Aerotechnique, Poitiers, France * VW-GEDAS, Berlin, Germany * Aerospatiale, Paris, France * Tanatsugu Co., Osaka, Japan * Tokyo Inst. of Tech., Yokohama, Japan

ISO Location	Oslo, Norway
Period	1/Jan/1992-8/Feb/1992
Audience	ISO/TC184/SC4/WG4/JWG9
Organizations represented	<ul style="list-style-type: none"> * Microelectronics & Computer Technology Corporation, Texas, USA * Norwegian Electric Power Research Inst. * Siemens, Erlangen, Germany * NIST, Maryland, USA * Fraunhofer Institut fur Graphische Datenverarbeitung, Darmstadt, Germany * Normenausschuss Maschinenbau, im DIN, Frankfurt, Germany * Institutet for Verkstadsteknisk Forskning, Gothenburg, Sweden * Kyushu Institute of Technology, Fukuoka, Japan * Institut de Recherche en Productique et Logistique, Arcueil, France * U. of Manchester, Comp. Sci. Dept, UK * Westinghouse, Maryland, USA * AT&T Network Systems, Hilversum, the Netherlands * GOSET, Nanterre, France

2. Model walk-through with IPO. Through the invitation of the IPO Electrical Application Committee (EAC), PIEE representatives have been attending the IPO quarterly meetings since 1991 to provide updated ARM model walk-through's to EE domain experts in the EAC sessions. The latest meetings include:

IPO Location	Mesa, Arizona, USA
Period	January 1994
Audience	IPO EAC attendees
Organizations represented	<ul style="list-style-type: none"> * Siemens AG, Erlangen, Germany * Logic Modeling, CA, USA * Raytheon, MA, USA * Allied-Signal Aerospace Co., MO, USA * Intermetrics, VA, USA * IBM Corporation, NY, USA * International TechneGroup Inc., OH, USA * Sandia National Lab., NM, USA * National Research Council, Ontario, Canada * National Semiconductor, ME, USA * INFO Enterprises, Inc., AZ, USA * Fraunhofer, Darmstadt, Germany * Institute of Machine Tools and Manufacturing, Swiss Institute of Technology, Eth Zurich, Switzerland * Grumman Data Systems, SC, USA * Daimler Benz, Ulm, Germany * NASA, MD, USA * Raytheon, MA, USA * South Carolina Research Authority, USA

IPO Location	Novi, Michigan, USA
Period	September 1993
Audience	IPO EAC attendees
Organizations represented	<ul style="list-style-type: none"> * South Carolina Research Authority, SC, USA * NIST, MD, USA * Sandia National Lab., NM, USA * CALS, Air Force, USA * JEH Consulting, CO, USA

IPO Location	Atlanta, Georgia, USA
Period	June 1993
Audience	IPO EAC attendees
Organizations represented	<ul style="list-style-type: none"> * Intermetrics, VA, USA * Grumman Data Systems, USA * Institute of Electrical and Electronics Engineers * NIST, MD, USA * National Research Council, Ontario, Canada * South Carolina Research Authority, SC, USA * Sandia National Lab., NM, USA

IPO Location	Nashville, Tennessee, USA
Period	April 1993
Audience	IPO EAC attendees
Organizations represented	<ul style="list-style-type: none"> * JEH Consulting, Inc. * Naval Air Warfare Center, CA, USA * South Carolina Research Authority, USA * NIST, MD, USA * NASA, MD, USA * Sandia National Lab., NM, USA * CALS, Air Force, USA * IBM Corporation, NY, USA * International TechneGroup Inc., OH, USA * General Dynamics, CN, USA * IPC, IL, USA

IPO Location	Costa Mesa, California, USA
Period	January 1993
Audience	IPO EAC attendees
Organizations represented	<ul style="list-style-type: none"> * South Carolina Research Authority, USA * Sandia National Lab., NM, USA * International TechneGroup Inc., OH USA * Raytheon, MA, USA * NASA, MD, USA * Air Force, USA

Earlier IPO meetings with PIEE's participation included the following:
October 1992 at Dallas/Fort Worth, TX;
July 1992 at Providence, RI;
April 1992 at Seattle, WA;
January 1992 at Salt Lake City, UT;
October 1991 at Houston, TX; and
July 1991 at Pittsburgh, PA.

3. American National Standards Institute (ANSI) Harmonization Workshops. The purpose of the workshops was to encourage those organizations responsible for making EE standards to:
 - o discuss their data models,
 - o map terms of one standard to others, and
 - o trace the origins and evolution of terms.

AP210 ARM was presented in the workshops in different stages of development. Suggestions received were incorporated into AP210 ARM. Suspected areas of overlap with and among the four ANSI standards being harmonized were based on an evaluation report entitled **Harmonizing CALS Product Data Description Standards** published by the Electronic Industries Association (EIA) Ad Hoc CALS Study Group in February 1989. The four ANSI standards involved are EDIF, IPC, IGES, and Very High Speed Integrated Circuit (VHSIC) Hardware Description Language (VHDL). In 1993, the workshop became the International Electrotechnical Commission (IEC) Technical Committee 93 (TC93) Working Group 1 (WG1).

Some of the dates and locations of the previous workshops were:

10-13-DEC-91 Albuquerque, NM, USA
13-15-MAY-92 Albuquerque, NM, USA
04-06-AUG-92 Tukwila, WA, USA
11-13-AUG-93 Albuquerque, NM, USA

4. Product Data Information Technology, Inc. (PDIT) Consulting. A STEP modeling consultant from PDIT, Inc. who is also the convener of ISO TC184/SC4/WG4, provided periodic reviews of the domain requirements from a modeling perspective in preparation of the ARM's interpretation and mapping to the STEP Integrated Resources. These meetings have included the following:
November 1992 at Hewlett-Packard in Palo Alto, CA;
February 1993 at SCRA, North Charleston, SC; and
September 1993 at PDES, Inc. off-site meeting in Tucson, AZ.

5. External Communications. Suggestions from the following activities were also incorporated into AP210:
 - a. ProSTEP Workshop in Berlin, Germany. The AP210 ARM was presented to the German STEP specialists in February 1993.
 - b. Workshop at Microelectronics and Computer Technology Corporation (MCC) in Austin, TX. A detail model walk-through and training on the ARM was presented to MCC domain experts by a PIEE representative on January 27-28, 1994.
 - c. ASEM CAx Alliance Meeting. On 18 February 1994 the units of functionality and associated key concepts were presented to ASEM members by an MCC expert in Marina Del Rey, CA. A preliminary mapping of the ASEM requirements to AP210 and EDIF PCB was attempted. ASEM is a DoD ARPA-funded program. Acceptance by ASEM could mean the endorsement of AP210 as a viable standard.
 - d. Detailed ARM walk-through given to Cadence and Digital Equipment Corporation representatives in Marlboro, MA on 25 February 1994.

3.3 Data Population

The DataProbe tool is used to generate a physical file based on user input data and the ARM EXPRESS schema. Realistic test cases were set up to test the entities within each unit of functionality (UoF) of the ARM. For example, fill the model entities of the PCA UoF that appear in the physical file with data which are used to describe the relationship between an integrated circuit (IC) and its socket so that both could be positioned and moved together. So far, the testing has been satisfactory for most UoF's. More vigorous testing will be performed for the geometry UoF which interfaces with IR Part 42: Geometric and topological representation.

3.4 Issues Log and Resolutions

There are about one hundred issues logged.

1. Critique from domain experts after the AP210 ARM release for Committee Draft for Comment (CDC) in July 1993. A domain expert from University of Manchester in England raised eight issues. They will be resolved.
2. Comments from IEC TC3 on AP210 CDC release received in March 1994 and will be resolved.

- a. Agreement or abstention from Czech Republic, Denmark, Italy, Japan, and Romania.
 - b. About forty-one comments from Switzerland, Sweden, and Finland.
3. There have been issues raised among PIEE members, member companies, and other interested external parties that have been resolved or that are under consideration.

4.0 INTEGRATED RESOURCES INTERPRETATION

4.1 Integrated Resources in Use

The following standards form the **Integrated Resources (IR)** from which information are interpreted to meet the specific information requirements of AP210 ARM:

1. ISO 10303-41 Industrial automation systems and integration -- Product data representation and exchange -- Part 41: Integrated resources: Fundamentals of product description and support.
2. ISO 10303-42 Industrial automation systems and integration -- Product data representation and exchange -- Part 42: Integrated resources: Geometric and topological representation.
3. ISO 10303-43 Industrial automation systems and integration -- Product data representation and exchange -- Part 43: Integrated resources: Representation structures.
4. ISO 10303-44 Industrial automation systems and integration -- Product data representation and exchange -- Part 44: Integrated resources: Product structure configuration.
5. ISO 10303-45 Industrial automation systems and integration -- Product data representation and exchange -- Part 45: Integrated resources: Material.
6. ISO 10303-46 Industrial automation systems and integration -- Product data representation and exchange -- Part 46: Integrated resources: Visual presentation.
7. ISO 10303-47 Industrial automation systems and integration -- Product data representation and exchange -- Part 47: Integrated resources: Shape variation tolerances.
8. ISO 10303-203 Industrial automation systems and integration -- Product data representation and exchange -- Part 203: Integrated resources: Configuration controlled 3D designs of mechanical parts and assemblies.

4.2 Interpretation Workshops

One STEP-modeling consultant from PDIT, Inc. and one from Grumman Data Systems Inc. assisted PIEE in constructing the ARM-to-AIM mapping tables with reference to the Integrated Resources. The workshops for this purpose were held in:

November 1993 at South Carolina Research Authority (SCRA) in N. Charleston, SC;

December 1993 at PDIT, Inc. in Long Beach, CA; and

February 1993 at PDIT, Inc. in Long Beach, CA.

4.3 Application Integrated Constructs (AIC)

AP210 AIC's will be developed in the future.

5.0 AIM VALIDATION

AP210 AIM validation will be performed after the Committee Draft (CD) release.

6.0 CONFORMANCE REQUIREMENTS & TEST GUIDANCE EVALUATION

6.1 Conformance Requirements & Classes

Conformance requirements and classes will be implemented in the future.

6.2 Abstract Test Suites

Abstract test suites will be implemented in the future.

7.0 AP VALIDATION WITH PROTOTYPE IMPLEMENTATION

A realistic validation of AP210 is performed through demonstrations of prototypes and vendor-specific ECAD-to-AP210 translators. Their successful performance will provide a higher level of confidence in the implementability and utility of the AP.

7.1 Demonstration Plan

A set of four demonstrations based on the IGES-EAC flasher signal circuit are used to validate the AP210 prototype. These demonstrations include:

1. Demo 1 -- Assemble PCA. This demonstration involved the translation of PCA design information from a Mentor Graphics System (MGS) to an AP210 physical file. The AP210 information was then fed to the Rapid Access Manufactured Part (RAMP) process planning software to provide manufacturing information for the flasher board.
 - a. The demonstration board was fabricated in October 1993 and presented at the Computer Aided Lifecycle Support (CALS) Exposition in November 1993 in Atlanta, GA. The translator used for the demonstration was co-developed by International TechneGroup Incorporated (ITI) and South Carolina Research Authority (SCRA) based on AP210 release 0.65.
 - b. A demonstration for the Design Automation Conference (DAC) in June 1994 will be performed using surface mount and through hole technologies, ten-layer board with dual side component mounting, and a PCA design used by the U.S. Navy.
2. Demo 2 -- Bare printed circuit board fabrication. This demonstration will show that AP210 provides sufficient data structures for exchanging necessary information for the fabrication of a printed circuit board, given that the design and layout of the various circuit paths and components have been identified and approved.

The demonstration is currently on hold pending identification of resources capable of generating software to translate AP210 structures into either IPC-D-350D or Gerber formats. These formats are key for photoplotting operations used in constructing bare printed circuit boards.

3. Demo 3 -- In-circuit test. This demonstration will show that AP210 provides sufficient data structures for exchanging necessary information for continuity testing of a printed circuit board, given that the design and layout of the various circuit paths and components have been identified and approved. This test will verify that conducting paths and areas meet electrical requirements of the design.

This demonstration is currently on hold pending identification of resources capable of generating software to translate AP210 structures into the required formats necessary for testing equipment.

4. Demo 4 -- Functional test. This demonstration will show that AP210 provides sufficient data structures for exchanging necessary information for verifying that the completed printed circuit assembly performs according to original design specifications and requirements.

This effort is currently on hold pending a review of work being on other Application Protocol development efforts.

7.2 Data Exchange between AP210 and AP220

In August 1994 there was an AP220 demonstration presented to PreAmp's Industry Review Board. It demonstrated how concurrent engineering will be enabled by data sharing through a common design and manufacturing engineering user interface. The prototype translator was developed to translate Mentor Graphics PCA design data to an AP210 physical file and then passed it to the RAMP software for process planning. The future realistic objective is to enable a full set of design data to be passed from AP210 to AP220 for PCA manufacturing and process planning. A fully functional interface provides a viable validation of AP210 capability.

7.3 Joint Demonstration by CFI/PIEE/PreAmp/RAMP

In the second quarter of 1993 a joint demonstration project was agreed on by CAD Framework Initiative (CFI), PIEE, PreAmp, and RAMP. The focus of the demonstration is on netlist, timing, EE physical design, PCA manufacturing, and process planning. The demonstration is scheduled to be held at the Design Automation Conference (DAC) in June 1994. DAC was chosen because it is the premiere exhibition center to gain industry acceptance.

The major capabilities to be demonstrated are:

- a. data archive;
- b. extract physical design data;
- c. bi-directional design-to-manufacturing interface;
- d. flexibility to use different CAx systems.

The business objectives are to demonstrate:

- a. the operational convergence of electrical standards;

- b. the support of the industry-wide goal to make electrical product data more usable among the EE/CAD systems;
- c. the framework to capture design process and manufacturing information over the PCA product life cycle.

7.4 Vendors Participation

EE/CAD vendors and member companies are encouraged to develop translators to convert the vendor-specific ECAD data to AP210's compliance data representation. The translators are effective AP validation tools. The current activities include:

- 1. Mentor Graphics Corporation is funding International TechneGroup Incorporated (ITI) to develop a Mentor-AP210 translator.
- 2. Racal-Redac Systems, Ltd. is supporting the National Institute of Standards and Technology (NIST, DoC, USA) to develop a Racal-Redac-AP210 translator.
- 3. Digital Equipment Corporation is developing a Cadence-AP210 translator.
- 4. Intergraph Corporation is developing an Intergraph-AP210 translator.
- 5. Harris Corporation (owner of Scicards) is still in consideration.

APPENDIX A AAM-TO-ARM MAPPING TABLE

<u>Object</u>	<u>UoF</u>	<u>ICOM</u>
access_code	util_uof	APPROVED PLAN(S), Archival data, CAD data reference, Engineering pdd, Product data, Production released product data set
advanced_b_rep	geom_uof	APPROVED PLAN(S), Archival data, CAD data reference, Engineering pdd, Product data, Production released product data set
alternate_product	cldm_uo f	Validated mechanical configuration, Updated parts list, Unavailable parts list, Tested PCB, Production released product data set, Product data, Preliminary parts list, PCA materials & components, Mechanical parts lists, Mechanical parts lists, Enhanced component packing data, Engineering released documentation set, Engineering pdd, Electronic design, Electrical/electronic product*, Detailed architecture, Critical component placement data, Component placement data, Archival data, Advanced parts list, Tested PCB, Placement data, Optimized routed board, Mechanical board design, Enhanced component packing data*, Engineering pdd, Electronic design, Detailed architecture, structure, Detailed architecture, Detailed architecture, Archival data, Accepted PCA,
analytic_model	util_uof	Board materials, Board requirements definition, Customer requirements, Finished Boards
assembled_by_bonding	pca_uof	Board requirements definition, Mechanical board design, Mechanical configuration, Mechanical parts lists, PCA materials & components, Preliminary product definition, Production released product data set
assembled_by_fasteners	pca_uof	Board requirements definition, Mechanical board design, Mechanical configuration, Mechanical parts lists, PCA materials & components, Preliminary product definition, Production released product data set
assembly_join	pca_uof	Board requirements definition, Mechanical board design, Mechanical configuration, Mechanical parts lists, PCA materials & components, Preliminary product definition, Production released product data set

<u>Object of ARM</u>	<u>UoF</u>	<u>ICOM of AAM</u>
axis_placement	geom_uof	Preliminary product definition, Production released product data set Board physical estimate, Board definition, Component placement data, Critical component placement data, Enhanced component packing data*, Mechanical board design, Mechanical configuration, Optimized routed board, Placement data, Placement parameters, Preliminary routed board data, Production released product data set, Routed board data, Routing control data, Routing features data, Routing layout data
b_spline_curve	geom_uof	Board definition, Mechanical board design, Optimized routed board, Preliminary routed board data, Production released product data set, Routed board data, Routing layout data
behavioral_port_definition	func_uof	Approved system design, Customer requirements, Detailed architecture, Detailed architecture. structure, Electronic design, Engineering pdd, Preliminary product definition
board_outline	pcb_uof	Approved system design, Board definition, Board requirements definition, Engineering released documentation set, Enhanced component packing data*, Finished Boards, Mechanical board design, Mechanical configuration, Optimized routed board, Placement data, Placement parameters, Preliminary routed board data, Product data, Production released product data set, Production released product data set, Routing features data, Routing layout data
bound_volume_shape	geom_uof	Customer requirements, Mechanical board design, Mechanical configuration, Production released product data set, Validated mechanical configuration,
bounded_curve	geom_uof	Board definition, Mechanical board design, Optimized routed board, Placement data, Preliminary routed board data, Routed board data, Routing features data, Routing layout data
bounding_function	geom_uof	Electronic design, Optimized routed board , Preliminary routed board data,

<u>Object of ARM</u>	<u>UoF</u>	<u>ICOM of AAM</u>
cartesian_point	geom_uof	Production released product data set, Routed board data, Routing layout data Board definition, Component placement data, Critical component placement data, Enhanced component packing data*, Mechanical board design, Optimized routed board, Placement data, Placement parameters, Preliminary routed board data, Production released product data set, Routed board data, Routing layout data
change_order	cmdm_uof	Approved system design, Customer requirements, Electronic design, Engineering released documentation set, Validated mfg. plan(s)
change_request	cmdm_uof	Approved system design, APPROVED PLAN(S), Archival data, Customer requirements, Electronic design, Engineering released documentation set, Validated mfg. plan(s)
characteristic	util_uof	Board materials, PCA materials & components
circle	geom_uof	Board definition, Mechanical board design, Mechanical configuration, PCA materials & components, Routed board data, Routing features data, Routing layout data
component_assy_relationship	pca_uof	Component placement data, Critical component placement data, Mechanical configuration, PCA materials & components, Placement data, Production released product data set , Validated mechanical configuration
component_placement	pca_uof	Component placement data, Critical component placement data, Enhanced component packing data*, Mechanical configuration, Optimized routed board, PCA materials & components, Placement data, Preliminary routed board data, Production released product data set, Routed board data, Routing features data, Routing layout data
component_sub_assy_relationship	pca_uof	Component placement data, Critical component placement data, Mechanical configuration, PCA materials & components, Placement data, Production released product data set , Validated mechanical configuration

<u>Object of ARM</u>	<u>UoF</u>	<u>ICOM of AAM</u>
component_termination	pca_uof	Customer requirements, PCA materials & components
component_termination_passage	pcb_uof	Optimized routed board, PCA materials & components, Placement data, Preliminary routed board data, Production released product data set , Routed board data, Routing features data, Routing layout data
composite_curve	geom_uof	Board definition, Mechanical board design, Optimized routed board, Preliminary routed board data, Routing layout data
composite_curve_segment	geom_uof	Board definition, Mechanical board design, Optimized routed board, Preliminary routed board data, Routing layout data
conductor	pcb_uof	Electronic design, Optimized routed board , Preliminary routed board data, Production released product data set, Routed board data, Routing layout data
configured_interface	rqmt_uof	Approved system design, Customer requirements, Engineering pdd, Mechanical configuration, Mechanical parts lists, PCA materials & components, Validated mechanical configuration
conic	geom_uof	Routing layout data
connectivity_allocation	allo_uof	Approved system design, Detailed architecture, Electronic design, Engineering pdd, Optimized routed board, Production released product data set
connector_component	rqmt_uof	Component placement data, Critical component placement data, Mechanical parts lists, PCA materials & components, Placement data, Preliminary parts list, Unavailable parts list, Updated parts list
connector_placement_relationship	rqmt_uof	Component placement data, Mechanical configuration, Optimized routed board, Placement data, Routed board data, Validated mechanical configuration,
connector_termination_constraint	rqmt_uof	PCA materials & components
coordinated_characteristic	util_uof	Board requirements definition, Customer requirements,
coordinated_numeric_parameter	util_uof	PCA materials & components
csg_solid	geom_uof	PCA materials & components
curve	geom_uof	PCA materials & components

<u>Object of ARM</u>	<u>UoF</u>	<u>ICOM of AAM</u>
curve_replica cutout	geom_uof pcb_uof	PCA materials & components Board definition, Mechanical board design
date	util_uof	Accepted PCA, Approved system design, APPROVED PLAN(S), Engineering released documentation set, Production released product data set, Validated mechanical configuration, Validated mfg. plan(s)
decomposable_functional_unit_definition	func_uof	Detailed architecture, Detailed architecture. structure, Electronic design
decomposable_requirement	rqmt_uof	Detailed architecture, Detailed architecture. structure, Electronic design
design_characteristic	rqmt_uof	Customer requirements, Electronic design
design_layer_stratum	pcb_uof	Board definition, Mechanical board design, Optimized routed board, Placement data, Preliminary routed board data, Production released product data set, Routed board data, Routing features data, Routing layout data
design_requirement design_specific_model design_specification designed_function designed_pca_part documentation_layer_stratum	rqmt_uof util_uof rqmt_uof func_uof part_uof pcb_uof	Customer requirements Electronic design Customer requirements Electronic design Electronic design Engineering released documentation set, Optimized routed board, Routed board data, Routing layout data
edge_based_wire_frame_model ee_approval	geom_uof util_uof	PCA materials & components Accepted PCA, Approved system design, APPROVED PLAN(S), Electrical/electronic product*, Engineering released documentation set, Production released product data set, Validated mechanical configuration, Validated mfg. plan(s)
ee_colour	util_uof	Customer requirements, Electrical/electronic product*
ee_device	part_uof	Advanced parts list, Electrical/electronic product*, PCA materials & components, Preliminary parts list, Production released product data set, Unavailable parts list, Updated parts list,
ee_document	util_uof	Advanced parts list, Approved system

<u>Object of ARM</u>	<u>UoF</u>	<u>ICOM of AAM</u>
ee_material	util_uof	design, APPROVED PLAN(S), Board requirements definition, Customer requirements, Engineering released documentation set, Mechanical parts lists, Preliminary product definition, Preliminary parts list, Product data, Production released product data set, Unavailable parts list, Updated parts list, Validated mfg. plan(s),
ee_measure	util_uof	Board materials, Electrical/electronic product*, PCA materials & components
ee_product	cmdm_uo f	Routing control data, Accepted PCA, Electrical/electronic product*, Engineering released documentation set,
ee_product_configuration	cmdm_uo f	Accepted PCA, Electrical/electronic product*, Engineering released documentation set,
ee_product_definition	cmdm_uo f	Accepted PCA, Electrical/electronic product*, Engineering released documentation set,
ee_product_version	cmdm_uo f	Approved system design, Electrical/electronic product*, Electronic design, Engineering released documentation set, Validated mechanical configuration, Validated mfg. plan(s)
ee_requirement	rqmt_uof	Customer requirements
ee_specification	rqmt_uof	Customer requirements
ee_text	util_uof	Finished Boards
ee_tolerance	util_uof	Finished Boards
ellipse	geom_uof	PCA materials & components
engineering_make_from	cmdm_uo f	Electronic design
external_access_functional_unit_port_definition	func_uof	Detailed architecture , Detailed architecture. structure, PCA materials & components
eyeletted_passage	pcb_uof	Optimized routed board, Placement data, Preliminary routed board data, Production released product data set, Routed board data, Routing features data
fabrication_technology_specification	rqmt_uof	Advanced parts list, Board requirements definition, Mechanical parts lists, PCA materials & components, Preliminary parts list, Unavailable parts list, Updated parts list
fiducial	pcb_uof	Board definition, Routing features data

<u>Object of ARM</u>	<u>UoF</u>	<u>ICOM of AAM</u>
filled_area	pcb_uof	Optimized routed board, Routed board data, Routing features data, Routing layout data
flexible_lead_placement	pca_uof	PCA materials & components, Component placement data
function_definition_allocation	allo_uof	Electronic design
functional_composition_relationship	func_uof	Electronic design
functional_connectivity_definition	func_uof	Electronic design
functional_port_definition_allocation	allo_uof	Electronic design
functional_unit	func_uof	Electronic design
functional_unit_allocation	allo_uof	Electronic design
functional_unit_definition	func_uof	Electronic design
functional_unit_definition_w_analytic_rep	func_uof	Electronic design
functional_unit_port	func_uof	Electronic design
functional_unit_port_allocation	allo_uof	Electronic design
functional_unit_port_definition	func_uof	Electronic design
functional_unit_requirement_allocation	allo_uof	Electronic design
hyperbola	geom_uof	Component placement data
inter_layer_join	pcb_uof	Optimized routed board, Routing features data, Routing layout data
interface_component	pca_uof	PCA materials & components
interface_component_termination	pca_uof	PCA materials & components
interface_mounted_join	pca_uof	PCA materials & components
interface_requirement	rqmt_uof	PCA materials & components
interface_specification	rqmt_uof	PCA materials & components
interfaced_component_sub_assembly	pca_uof	PCA materials & components
internal_access_functional_unit_port_definition	func_uof	PCA materials & components
internal_stratum_access	pcb_uof	Routing features data, Routing layout data
intra_layer_join	pcb_uof	Routing features data, Routing layout data
join_point	pcb_uof	Routing features data, Routing layout data
join_relationship	pcb_uof	Routing features data, Routing layout data
land	pcb_uof	Routing features data, Routing layout data
language_reference_manual	rqmt_uof	Customer requirements
layer	pcb_uof	Board definition, Board materials, Optimized routed board, Preliminary routed board data, Routing layout data
layer_connection_point	pcb_uof	Optimized routed board, Routing features data, Routing layout data
layout_item	pcb_uof	Routing features data, Routing layout data
library_function	func_uof	PCA materials & components
library_item	util_uof	PCA materials & components
library_model	util_uof	PCA materials & components

<u>Object of ARM</u>	<u>UoF</u>	<u>ICOM of AAM</u>
library_pca_part	part_uof	PCA materials & components
line	geom_uof	Routing layout data
marked_text	util_uof	Engineering released documentation set
marking	part_uof	Finished Boards, PCA materials & components
material_composition_relationship	util_uof	Board materials, PCA materials & components
material_specification	rqmt_uof	Board materials, PCA materials & components
net_element	func_uof	Detailed architecture, Electronic design, Optimized routed board, Routed board data, Routing layout data
net_element_relationship	func_uof	Detailed architecture, Electronic design, Optimized routed board, Routed board data, Routing layout data
net_vertex_allocation	pcb_uof	Detailed architecture, Electronic design, Optimized routed board, Routed board data, Routing layout data
net_w_jumpers	pcb_uof	Detailed architecture, Electronic design, Optimized routed board, Routed board data, Routing layout data
net_w_o_jumper	pcb_uof	Detailed architecture, Electronic design, Optimized routed board, Routing layout data
numeric_parameter	util_uof	Routing layout data, Design rules data, Engineering pdd, Placement parameters
organization	util_uof	Customer requirements
orientation	geom_uof	PCA materials & components
package	part_uof	PCA materials & components, Product data
package_body	part_uof	PCA materials & components, Product data
package_termination	part_uof	PCA materials & components, Product data
packaged_component	pca_uof	PCA materials & components, Product data
packaged_component_termination	pca_uof	PCA materials & components, Product data
packaged_connector_termination_relationship	part_uof	PCA materials & components, Product data
packaged_part	part_uof	PCA materials & components, Product data
packaged_part_termination	part_uof	PCA materials & components
packaging_relationship	part_uof	Component placement data, Critical component placement data, Mechanical parts lists, PCA materials & components, Updated parts list
packaging_specified_placement	pca_uof	Routing layout data

<u>Object of ARM</u>	<u>UoF</u>	<u>ICOM of AAM</u>
parabola	geom_uof	Routing layout data
part_association	part_uof	Component placement data, Critical component placement data, Mechanical parts lists, PCA materials & components, Updated parts list
passage_component_relationship	pcb_uof	Accepted PCA, Design rules data, Electrical/electronic product*
pca	pca_uof	Product data, PCA materials & components, Product data
pca_component	pca_uof	Product data, PCA materials & components, Product data
pca_component_requirement_allocation	allo_uof	Product data, PCA materials & components, Product data
pca_geometric_representation	geom_uof	Product data, PCA materials & components, Product data
pca_part	part_uof	Product data, PCA materials & components, Product data
pcb	pcb_uof	Accepted PCA, Board definition, Finished Boards, PCA materials & components, Tested PCB
pcb_curve_loop	geom_uof	Board definition
pcb_face	geom_uof	Board definition
pcb_passage	pcb_uof	Board definition
pcb_passage_feature	pcb_uof	Board definition
pcb_specified_placement	pca_uof	Board definition
person	util_uof	Customer requirements
physical_connectivity_definition	pca_uof	Electronic design
physical_connectivity_element	pca_uof	Electronic design
physical_device_port	part_uof	Electronic design
physical_hierarchy_connectivity_definition	pca_uof	Electronic design
physical_junction	pca_uof	Electronic design
physical_net	pcb_uof	Electronic design
physical_unit	part_uof	Electronic design
planned_date_effectivity	cmdm_uo f	Approved system design, Engineering released documentation set
planned_effectivity	cmdm_uo f	Approved system design, Engineering released documentation set
planned_lot_effectivity	cmdm_uo f	Approved system design, Engineering released documentation set
planned_serial_number_effectivity	cmdm_uo f	Approved system design, Engineering released documentation set
plated_through_passage	pcb_uof	Component placement data, Critical component placement data, Engineering released documentation set, Optimized routed board, Placement data, Production released product data set, Routed board data, Routing features data
polyline	geom_uof	Routing layout data
port_equivalency_relationship	func_uof	Electronic design

<u>Object of ARM</u>	<u>UoF</u>	<u>ICOM of AAM</u>
prepared_terminal	part_uof	PCA materials & components
printed_component	pca_uof	PCA materials & components
printed_component_termination	pca_uof	PCA materials & components
printed_part	part_uof	PCA materials & components
printed_part_termination	part_uof	PCA materials & components
probe_access_area	pcb_uof	Optimized routed board, Routing features data
process_specification	rqmt_uof	Engineering released documentation set, Validated mfg. plan(s)
purpose	rqmt_uof	Customer requirements
requirement_composition	rqmt_uof	Customer requirements
requirement_occurrence	rqmt_uof	Customer requirements
restriction_passage	pcb_uof	Design rules data, Placement data, Routing control data, Routing layout data
rqmt_or_spec_allocation	allo_uof	Customer requirements, Detailed architecture, Electronic design
solid_of_linear_extrusion	geom_uof	PCA materials & components
solid_of_revolution	geom_uof	PCA materials & components
special_symbol	geom_uof	Customer requirements, PCA materials & components, Routing features data
special_symbol_feature	pcb_uof	Customer requirements, PCA materials & components, Routing features data
start_order	cmdm_uo f	Engineering released documentation set
start_request	cmdm_uo f	Engineering released documentation set
stratum	pcb_uof	Board definition, Board materials, Board requirements definition, Optimized routed board, Placement data, Preliminary routed board data, Production released product data set, Routed board data, Routing features data, Routing layout data,
stratum_feature	pcb_uof	Board definition, Board materials, Board requirements definition, Optimized routed board, Placement data, Preliminary routed board data, Production released product data set, Routed board data, Routing features data, Routing layout data
stratum_feature_association	pcb_uof	Board definition, Board materials, Board requirements definition, Optimized routed board, Placement data, Preliminary routed board data, Production released product data set, Routed board data Routing features data, Routing layout data,
stratum_feature_component_relationship	pcb_uof	Component placement data, Board

<u>Object of ARM</u>	<u>UoF</u>	<u>ICOM of AAM</u>
structural_configuration	func_uof	requirements definition Detailed architecture. structure, Electronic design
structure_def	util_uof	Engineering released documentation set
structured_text	util_uof	Engineering released documentation set
styled_text	geom_uof	Finished Boards, Production released product data set, Routed board data, Routing features data,
supplier	util_uof	PCA materials & components
supplier_part_version	part_uof	PCA materials & components
surface_finish_specification	rqmt_uof	Board requirements definition, Finished Boards,
surface_mount_land	pcb_uof	PCA materials & components PCA materials & components, Routing features data
technology	util_uof	Board requirements definition, Customer requirements, Validated mfg. plan(s)
template_item	util_uof	Archival data, Electronic design, PCA materials & components
terminal	part_uof	Electrical/electronic product*, Mechanical parts lists, PCA materials & components, Updated parts list
termination_constraint	rqmt_uof	Electronic design
text_feature	pcb_uof	Routing features data
trimmed_curve	geom_uof	Board requirements definition
unspecified_placement	pca_uof	Component placement data
work_order	cmdm_uo	Validated mfg. plan(s)
work_request	f	
	cmdm_uo	Validated mfg. plan(s)
	f	

APPENDIX BTEST CASES & DATA POPULATION PHYSICAL FILES**B.1 Test Cases****1. Test Case: Allocation UoF**

- a. Populate the model entities which describe the association between "functional" gate and a real part that encapsulates that function. The specific example will be performed on a NAND gate to a SN74xx00 family member.
- b. Populate the model entities which describe the association between a real part and the "functional" gates which are encapsulated by the real part. The specific example will be performed on a SN74xx00 family member and a NAND gate.

2. Test Case: CMDM UoF

- a. Populate the model entities required to track an "Engineering Change" to a released product. The specific example will be performed on the FLASHER design. The reason for change is attributed to a customer complaint, the flash rate of the LEDs is too fast. The change effects the values of R2, C1 and C2 but, not the package styles.
- b. Populate the model entities for the above case but, allowing both versions to exist as separate products, have as a released product a fast rate flasher and a slow rate flasher.

3. Test Case: Functional UoF

- a. Populate the model entities which show how a Programmable Array Logic device (PAL) can be decomposed into constituent logical units, discrete gate types, (NAND, NOR, XOR, etc) to implement a specific function.

4. Test Case: Geometry UoF

- a. Populate the model entities which will describe the physical shape of a conductor as it would appear on a PCB.

- b. Populate the model entities which will describe the physical shape of an eight lead flat pack's layout pattern as it would appear on a PCB.

5. Test Case: Part UoF

- a. Populate the model entities which shows how a ferrite bead can be associated to a specific resistor of a given PCA design.
- b. Populate the model entities which will describe the different possible mounting styles of a specific axial component. The specific example will be performed on a resistor showing different mountings like horizontal, vertical, surface.
- c. Populate the model entities which will describe how a printed capacitor would be implemented on a PCA/PCB design.
- d. Populate the model entities which shows how an IC would be mounted into a compatible socket.

6. Test Case: PCA UoF

- a. Populate the model entities which will describe the relationship between an IC and its socket; such that both will be positioned and may be moved together.

7. Test Case: PCB UoF

- a. Populate the model entities which describe the situation when a net can not be fully implemented within the confines of the PCB outline and layer structure, a incomplete route. For this occurrence a jumper/"green wire" is to be used to realize the conduction path in order to get the circuit to function as designed, complete the route of the given net.

8. Test Case: Requirement UoF

- a. Populate the model entities which show how a specific specification will get permeated through out the schema. The specific example will use the following specifications:
 - i. MIL-P-55110 PCB specification
 - ii. MIL-M-38510 IC specification

- b. Populate the model entities which will describe how a requirement to use a specification is permeated through a design. The specific example will be based upon the above case.
- c. Populate the model entities of a specific requirement which will provide information concerning part selection. The specific example will be related to the operational environment that a given design must survive.
- d. Populate the model entities necessary to specify a customer's requirement to have a design "work" within a next higher assembly. The specific example will be limited to the connector and interface_signals are previously defined from the next higher assembly's design.

9. Test Case: Utility UoF

- a. Populate the model entities which will show the association of a given design to a mathematical model. The specific example will show the relation of the FLASHER to an analytic_model.
- b. Populate the model entities which will show the association of a given part to a mathematical model. The specific example will show the relation between a 555 timer to an analytic_model. The model will able to be reused for other occurrences of the same part.
- c. Populate the model entities which describe how a material specification causes an impact in other areas.
- d. Populate the model entities which describe how a tolerance in material composition can alter a given part's characteristic.

10. Test Case: Complete PCA

Test population of a complete PCA.

B.2 List of Physical Files

<u>Physical File</u>	<u>Purpose</u>
allo.one	test case 1a
allo.two	test case 1b
cmdm.one	test case 2a
cmdm.two	test case 2a
flasher	test case 10
func.one	test case 3a
geom.one	test case 4a
geom.two	test case 4b
part.four	test case 5d
part.one	test case 5a
part.three	test case 5c
part.two	test case 5b
pca.one	test case 6a
...	test case 7
rqmt.four	test case 8d
rqmt.one	test case 8a
rqmt.three	test case 8c
rqmt.two	test case 8b
util.four	test case 9d
util.one	test case 9a
util.three	test case 9c
util.two	test case 9b

B.3 Description of Physical Files

In an effort to keep the size of the files reasonable and not loaded with extraneous entities, some "short cuts" were taken. The specifics for each file are as follows:

1. Allo.one shows the association between a functional gate and it's physical equivalent. Attributes and entities which describe any geometry of the part or sections of the part were omitted. Characteristics and numeric parameters were omitted. Also any detailed information on materials were omitted.
2. Allo.two shows the association between a physical gate and it's functional equivalent. The same omissions from allo.one were also followed in this example.
3. Ccmdm.one shows how an engineering change may be tracked. The detailed product entities were omitted. All the entities shown deal with the tracking of a change; not the data that was changed.
4. Ccmdm.two shows how a different version of an established product can be tracked. The same omissions from cmdm.one were also followed in this example.
5. Flasher shows a finished Printed Wiring Assembly. Geometric part and Printed Circuit Board information was omitted. However, the positioning of the components on to the board, as well as, the plated through hole for the components are accurate. Just the shape of parts and conductor shapes are missing but, their position in the file are accurate.
6. Func.one shows how discrete functional gates can be used to construct another functional device. Only a limited number of characteristics and parameters were used in this example.
7. Geom.one shows how a conductor on a Printed Circuit Board can be described. It is not certain that the cartesian points, orientations, and geometric entities used will construct a shape that does look like a conductor. However, the order and manner in which they were used are accurate.
8. Geom.two shows how a land for a surface mounted part can be described. The same disclaimer from geom.one applies to this file as well.
9. Part.one shows how an association between two parts can occur. Attributes and entities which describe any geometry of the part or sections of the part were omitted. Characteristics and numeric parameters were omitted. Also any detailed information on materials were omitted.
10. Part.two shows how an axial component can be mounted in different styles. The same

omissions from part.one were also followed in this example.

11. Part.three shows how a printed part can be described. The same omissions from part.one were also followed in this example.
12. Part.four shows how an Integrated Circuit can be associated with a compatible socket. The same omissions from part.one were also followed in this example.
13. Pca.one shows the same association of a socket to an Integrated Circuit but, treats them as an inseparable part. Attributes and entities which describe any geometry of the part or sections of the part were omitted. Characteristics and numeric parameters were omitted. Also any detailed information on materials were omitted.
14. Rqmt.one shows how specifications get permeated through out a design. Specific information on the Printed Circuit Board were omitted.
15. Rqmt.two shows how a specification becomes a requirement and how it gets imposed through out a design. Geometric and certain part information were omitted.
16. Rqmt.three shows how a requirement to utilize a specification associates certain performance criteria to specific parts. Geometric information on these parts was omitted. Limited performance information on the parts were provided.
17. Rqmt.four shows how a requirement for a product to work within a higher assembly can be described. Geometric information on the parts was omitted.
18. Util.one shows how a mathematical model can be associated to a given design. Detailed information on the product was omitted.
19. Util.two shows how a mathematical model can be associated to a given part. Limited performance information on the part was provided.
20. Util.three shows how a material specification can get associated to certain parts. Detailed information on the product was omitted.
21. Util.four shows how a tolerance in the material's composition can alter the material's characteristic. Limited material information was provided.

B.4 CONTENT OF PHYSICAL FILES

```

:::::::
allo.one
:::::::

STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION('Test Case 1a','');
FILE_NAME('allo.one','1994-04-12 08:41:10','James J. Kachmarsky','Tobyhanna
Army Depot','');
'dp_sum_86.01','');
FILE_SCHEMA('Allo UoF');
ENDSEC;
DATA;
(* The following entries identify the part aspects of the functional_unit_definition
allocation to part.*)
C#1=BEHAVIORAL_PORT_DEFINITION(#2,'IN1');
I#2=FUNCTIONAL_UNIT_DEFINITION_W_ANALYTIC REP('NAND',$,$);
C#3=BEHAVIORAL_PORT_DEFINITION(#2,'IN2');
C#5=BEHAVIORAL_PORT_DEFINITION(#2,'OUT1');
C#7=FUNCTION_DEFINITION_ALLOCATION(#2,#11);
C#9=FUNCTIONAL_PORT_DEFINITION_ALLOCATION(#1,#10);
C#10=PHYSICAL_DEVICE_PORT(#11,'one',$);
C#11=EE_DEVICE($,#12,$,$,$,$,'Silicon','Ion Implantation','00');
C#12=TECHNOLOGY('Transistor Transistor Logic','Ion Implantation','Silicon');
C#13=PHYSICAL_DEVICE_PORT(#11,'two',$);
C#14=PHYSICAL_DEVICE_PORT(#11,'three',$);
C#15=FUNCTIONAL_PORT_DEFINITION_ALLOCATION(#3,#13);
C#16=FUNCTIONAL_PORT_DEFINITION_ALLOCATION(#5,#14);
(* The following entities identify the functional_unit and its
allocation to components*)
C#17=FUNCTIONAL_UNIT_PORT_ALLOCATION(#50,#35);
C#19=PACKAGED_COMPONENT(#20,$,$,$,$,'U1');
C#20=PACKAGED_PART($,#23,$,$,$,$,$,#24,'54LS00',#25);
C#21=TECHNOLOGY('Dual Inline Package','?','?');
C#23=TECHNOLOGY('Dual Inline Package','?','?');
C#24=EE_MATERIAL($,'?',$,$,$);
C#25=EE_MATERIAL($,'stuff',$,$,$);
C#27=PACKAGED_PART_TERMINATION(#10,#28,.T.,#20,'ONE');
C#28=PACKAGE_TERMINATION(#29,#40,#42,#45);
I#29=PREPARED_TERMINAL($,#30,$,$,$,$,$,$,#32,#46,#31);
C#30=TECHNOLOGY('lead','extrusion','?');
I#31=TERMINAL($,#30,$,$,$,$,$,$,#33,#46);
C#32=EE_TEXT('Standard Horizontal Mounting');
C#33=EE_TEXT('Standard Unprepared');
C#35=FUNCTIONAL_UNIT_PORT(#36,#37);

```

```
C#36=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#8,'IN1');
I#37=FUNCTIONAL_UNIT('NAND 2',#8,$);
C#40=PACKAGE_BODY($,#41,$,$,$,$,#59);
C#41=TECHNOLOGY('?','?','?');
C#42=AXIS_PLACEMENT(#43,#44);
C#43=ORIENTATION((1,0,0));
C#44=CARTESIAN_POINT((#47,#48,#49));
C#45=PACKAGE($,$,$,$,$,$,'DIP 14');
C#46=EE_MATERIAL($,'Copper Nickel Tin 725 alloy',$,$,$);
C#47=EE_MEASURE(0.03,'inches');
C#48=EE_MEASURE(0.02,'inches');
C#49=EE_MEASURE(0.125,'inches');
C#50=PACKAGED_COMPONENT_TERMINATION(#19,#27);
C#51=PACKAGED_PART_TERMINATION(#13,#52,.F.,#20,'TWO');
C#52=PACKAGE_TERMINATION(#29,#40,#53,#45);
C#53=AXIS_PLACEMENT(#43,#54);
C#54=CARTESIAN_POINT((#55,#48,#49));
C#55=EE_MEASURE(0.13,'inches');
C#56=FUNCTIONAL_UNIT_PORT_ALLOCATION(#57,#58);
C#57=PACKAGED_COMPONENT_TERMINATION(#19,#51);
C#58=FUNCTIONAL_UNIT_PORT(#60,#37);
C#59=EE_MATERIAL($,'ceramic',$,$,$);
C#60=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#8,'IN2');
C#61=PACKAGED_PART_TERMINATION(#14,#62,.F.,#20,'THREE');
C#62=PACKAGE_TERMINATION(#29,#40,#63,#45);
C#63=AXIS_PLACEMENT(#43,#64);
C#64=CARTESIAN_POINT((#65,#48,#49));
C#65=EE_MEASURE(0.23,'inches');
C#66=FUNCTIONAL_UNIT_PORT_ALLOCATION(#67,#68);
C#67=PACKAGED_COMPONENT_TERMINATION(#19,#61);
C#68=FUNCTIONAL_UNIT_PORT(#69,#37);
C#69=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#8,'OUT');
ENDSEC;
END-STEP_WORKING_SESSION;
```

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:::::::::::  
allo.two  
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STEP_WORKING_SESSION;  
HEADER;  
FILE_DESCRIPTION(("Test Case 1b"),' ');  
FILE_NAME('allo.two','1994-03-22 08:54:43',(James J. Kachmarsky),(Tobyhanna Army Depot),'  
'dp_sum_86.01','');  
FILE_SCHEMA((Allo UoF));  
ENDSEC;  
DATA;  
C#1=PACKAGED_COMPONENT(#2,$,$,$,'U1');  
C#2=PACKAGED_PART($,#3,$,$,$,$,#4,'54LS00',#5);  
C#3=TECHNOLOGY('Dual Inline Package','?','?');  
C#4=EE_MATERIAL($,'ceramic',$,$,$);  
C#5=EE_MATERIAL($,'goop',$,$,$);  
I#6=FUNCTIONAL_UNIT('U1',#7,$);  
I#7=FUNCTIONAL_UNIT_DEFINITION_W_ANALYTIC REP('NAND',$,$);  
C#8=FUNCTIONAL_UNIT_ALLOCATION(#6,#1);  
I#9=FUNCTIONAL_UNIT('U2',#7,$);  
I#10=FUNCTIONAL_UNIT('U3',#7,$);  
C#11=FUNCTIONAL_UNIT_ALLOCATION(#9,#1);  
I#12=FUNCTIONAL_UNIT('U4',#7,$);  
C#13=FUNCTIONAL_UNIT_ALLOCATION(#10,#1);  
C#14=PACKAGED_COMPONENT_TERMINATION(#1,#20);  
C#13=FUNCTIONAL_UNIT_ALLOCATION(#12,#1);  
C#20=PACKAGED_PART_TERMINATION(#21,#24,.T.,#16,'IN1 A');  
C#21=PHYSICAL_DEVICE_PORT(#22,'ONE',$);  
C#22=EE_DEVICE($,#23,$,$,$,$,'Silicon','Ion Implantation','LS00');  
C#23=TECHNOLOGY('Transistor Transistor Logic','Ion Implantation','?');  
I#24=PACKAGE_TERMINATION(#25,#29,$,#32);  
I#25=TERMINAL($,#26,$,$,$,$,$,#27,#28);  
C#26=TECHNOLOGY('lead','extrusion','?');  
I#27=EE_TEXT($);  
C#28=EE_MATERIAL($,'Copper Nickel Tin',$,$,$);  
C#29=PACKAGE_BODY($,#30,$,$,$,$,#31);  
C#30=TECHNOLOGY('?','?','?');  
C#31=EE_MATERIAL($,'ceramic',$,$,$);  
C#32=PACKAGE($,#17,$,$,$,$,'DIP 14');  
C#33=PACKAGED_COMPONENT_TERMINATION(#1,#34);  
C#34=PACKAGED_PART_TERMINATION(#35,#36,.F.,#2,'IN2 A');  
C#35=PHYSICAL_DEVICE_PORT(#22,'TWO',$);  
I#36=PACKAGE_TERMINATION(#25,#29,$,#32);  
C#37=PACKAGED_COMPONENT_TERMINATION(#1,#38);  
C#38=PACKAGED_PART_TERMINATION(#39,#40,.F.,#2,'OUT A');  
C#39=PHYSICAL_DEVICE_PORT(#22,'THREE',$);  
I#40=PACKAGE_TERMINATION(#25,#29,$,#32);  
C#41=PACKAGED_COMPONENT_TERMINATION(#1,#42);
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C#42=PACKAGED_PART_TERMINATION(#43,#44,.F.,#2,'IN1 B');
C#43=PHYSICAL_DEVICE_PORT(#22,'FOUR',$);
I#44=PACKAGE_TERMINATION(#25,#29,$,#32);
C#45=PACKAGED_COMPONENT_TERMINATION(#1,#46);
C#46=PACKAGED_PART_TERMINATION(#47,#48,.F.,#2,'IN2 B');
C#47=PHYSICAL_DEVICE_PORT(#22,'FIVE',$);
I#48=PACKAGE_TERMINATION(#25,#29,$,#32);
C#49=PACKAGED_COMPONENT_TERMINATION(#1,#50);
C#50=PACKAGED_PART_TERMINATION(#51,#52,.F.,#2,'OUT B');
C#51=PHYSICAL_DEVICE_PORT(#22,'SIX',$);
I#52=PACKAGE_TERMINATION(#25,#29,$,#32);
C#54=PACKAGED_COMPONENT_TERMINATION(#1,#55);
C#55=PACKAGED_PART_TERMINATION(#56,#57,.F.,#2,'IN1 C');
C#56=PHYSICAL_DEVICE_PORT(#22,'EIGHT',$);
I#57=PACKAGE_TERMINATION(#25,#29,$,#32);
C#58=PACKAGED_COMPONENT_TERMINATION(#1,#59);
C#59=PACKAGED_PART_TERMINATION(#60,#61,.F.,#2,'IN2 C');
C#60=PHYSICAL_DEVICE_PORT(#22,'NINE',$);
I#61=PACKAGE_TERMINATION(#25,#29,$,#32);
C#62=PACKAGED_COMPONENT_TERMINATION(#1,#63);
C#63=PACKAGED_PART_TERMINATION(#64,#65,.F.,#2,'OUT C');
C#64=PHYSICAL_DEVICE_PORT(#22,'TEN',$);
I#65=PACKAGE_TERMINATION(#25,#29,$,#32);
C#66=PACKAGED_COMPONENT_TERMINATION(#1,#67);
C#67=PACKAGED_PART_TERMINATION(#68,#69,.F.,#2,'IN1 D');
C#68=PHYSICAL_DEVICE_PORT(#22,'ELEVEN',$);
I#69=PACKAGE_TERMINATION(#25,#29,$,#32);
C#70=PACKAGED_COMPONENT_TERMINATION(#1,#71);
C#71=PACKAGED_PART_TERMINATION(#72,#73,.F.,#2,'IN2 D');
C#72=PHYSICAL_DEVICE_PORT(#22,'TWELVE',$);
I#73=PACKAGE_TERMINATION(#25,#29,$,#32);
C#74=PACKAGED_COMPONENT_TERMINATION(#1,#75);
C#75=PACKAGED_PART_TERMINATION(#76,#77,.F.,#2,'OUT D');
C#76=PHYSICAL_DEVICE_PORT(#22,'THIRTEEN',$);
I#77=PACKAGE_TERMINATION(#25,#29,$,#32);
C#78=FUNCTIONAL_UNIT_PORT(#79,#6);
C#79=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'IN1');
C#81=FUNCTIONAL_UNIT_PORT(#82,#6);
C#82=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'IN2');
C#84=FUNCTIONAL_UNIT_PORT(#85,#6);
C#85=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'OUT');
C#87=FUNCTIONAL_UNIT_PORT(#88,#9);
C#88=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'IN1');
C#89=FUNCTIONAL_UNIT_PORT(#90,#9);
C#90=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'IN2');
C#91=FUNCTIONAL_UNIT_PORT(#92,#9);
C#92=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'OUT');
C#93=FUNCTIONAL_UNIT_PORT(#94,#10);
C#94=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'IN1');

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C#95=FUNCTIONAL_UNIT_PORT(#96,#10);
C#96=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'IN2');
C#97=FUNCTIONAL_UNIT_PORT(#98,#10);
C#98=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'OUT');
C#99=FUNCTIONAL_UNIT_PORT(#100,#12);
C#100=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'IN1');
C#101=FUNCTIONAL_UNIT_PORT(#102,#12);
C#102=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'IN2');
C#103=FUNCTIONAL_UNIT_PORT(#104,#12);
C#104=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#7,'OUT');
C#105=FUNCTIONAL_UNIT_PORT_ALLOCATION(#14,#78);
C#106=FUNCTIONAL_UNIT_PORT_ALLOCATION(#33,#81);
C#107=FUNCTIONAL_UNIT_PORT_ALLOCATION(#37,#84);
C#108=FUNCTIONAL_UNIT_PORT_ALLOCATION(#41,#87);
C#109=FUNCTIONAL_UNIT_PORT_ALLOCATION(#45,#89);
C#110=FUNCTIONAL_UNIT_PORT_ALLOCATION(#49,#91);
C#111=FUNCTIONAL_UNIT_PORT_ALLOCATION(#54,#93);
C#112=FUNCTIONAL_UNIT_PORT_ALLOCATION(#58,#95);
C#113=FUNCTIONAL_UNIT_PORT_ALLOCATION(#62,#97);
C#114=FUNCTIONAL_UNIT_PORT_ALLOCATION(#66,#99);
C#115=FUNCTIONAL_UNIT_PORT_ALLOCATION(#70,#101);
C#116=FUNCTIONAL_UNIT_PORT_ALLOCATION(#74,#103);
ENDSEC;
END-STEP_WORKING_SESSION;
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cmdm.one
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STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION(("Test Case 2a"),' ');
FILE_NAME('cmdm.one','1994-03-22 08:58:53','(James J. Kachmarsky),(Tobyhanna Army Depot)',,'dp_sum_86.01','');
FILE_SCHEMA('CMDM UoF');
ENDSEC;
DATA;
C#1=EE_PRODUCT('Flasher','Through Hole/Double Sided',#2,'AP210AD01',.F.,'assembly');
C#2=ORGANIZATION('Naval Air Warfare Center','?');
C#3=EE_PRODUCT_VERSION(#1,#2,#4,$,$,#6,'A',.RELEASED.);
C#4=SUPPLIER_PART_VERSION(#5,'AP210AD001',.T.,(#19,#20));
C#5=SUPPLIER(#2,'14850');
C#6=ACCESS_CODE();
C#7=EE_PRODUCT_DEFINITION(#3,'flasher','1234','used to drive LEDs at a specified duration',#8,(#21,#25),(#2,#9));
C#8=DATE();
C#9=PERSON(#2,'Garland A. Borden III','?');
C#10=WORK_ORDER((#17),(#11),(#27),'L01MOP','?','see customer complaint letter',(#3));
C#11=WORK_REQUEST((#14),#12,#27,'???'#,13,'Change the values of the following components R1 and R2','customer complaint',#3,'NOW !!');
C#12=ORGANIZATION('RAMP Cell','RM-P');
C#13=DATE();
C#14=CHANGE_REQUEST(#15,#16,'CO-L01MOP','1');
C#15=EE_TEXT('Increase the LED ONTIME to 1 second','Maintain both versions');
C#16=EE_TEXT('Change R1 to 100 kohms','Change R2 to 1.4 Mohms');
C#17=CHANGE_ORDER(#13,#18,'Slower Flasher');
C#18=EE_TEXT('Change R1 to RLR07C1003KN','Change R2 to RLR07C1404KN');
C#19=EE_APPROVAL('Production',#2,.T.,#28);
C#20=EE_APPROVAL('Design Review',#9,.T.,#8);
C#21=EE_DOCUMENT((#22,#23),#20,(#24),$,#8,#6,'PCB Data',#2);
C#22=MARKED_TEXT();
C#23=MARKED_TEXT();
C#24=EE_TEXT('Master Patterns','Drill Table');
C#25=EE_DOCUMENT((#22,#23),#20,(#26),$,#8,#6,'PCA Data',#2);
C#26=EE_TEXT('Assembly Data');
C#27=EE_APPROVAL('Design Change',#2,.T.,#13);
C#28=DATE();
ENDSEC;
END-STEP_WORKING_SESSION;

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cmdm.two  
::::::::::::::::::  
  
STEP_WORKING_SESSION;  
HEADER;  
FILE_DESCRIPTION(("Test Case 2a"),' ');  
FILE_NAME('cmdm.two','1994-04-11 09:35:43','(James J. Kachmarsky),(Tobyhanna Army  
Depot)',,'dp_sum_86.01','');  
FILE_SCHEMA(('Cmdm UoF','Util UoF'));  
ENDSEC;  
DATA;  
C#1=EE_PRODUCT('Flasher','Through Hole/Double Sided',#2,'AP210AD01',.F.,'assembly');  
C#2=ORGANIZATION('Naval Air Warfare Center','?');  
C#3=EE_PRODUCT_VERSION(#1,#2,#4,$,$,#6,'A',.RELEASED.);  
C#4=SUPPLIER_PART_VERSION(#5,'AP210AD01',.T.,(#19,#20));  
C#5=SUPPLIER(#2,'14850');  
C#6=ACCESS_CODE();  
C#7=EE_PRODUCT_DEFINITION(#3,'flasher','1234','used to drive LEDs at a .8 second  
duration',#8,(#21,#25),(#2,#9));  
C#8=DATE();  
C#9=PERSON(#2,'Garland A. Borden III','?');  
C#19=EE_APPROVAL('Production',#2,.T.,#28);  
C#20=EE_APPROVAL('Design Review',#9,.T.,#8);  
C#21=EE_DOCUMENT((#22,#23),#20,(#24),$,#8,#6,'PCB Data',#2);  
C#22=MARKED_TEXT();  
C#23=MARKED_TEXT();  
C#24=EE_TEXT('Master Patterns','Drill Table'));  
C#25=EE_DOCUMENT((#22,#23),#20,(#26),$,#8,#6,'PCA Data',#2);  
C#26=EE_TEXT('Assembly Data'));  
C#28=DATE();  
C#29=EE_PRODUCT('Flasher new','Through Hole/Double Sided',#2,'AP210AD02',.F.,'assembly');  
C#30=EE_PRODUCT_VERSION(#29,#2,#31,(#35),$,#32,'A',.RELEASED.);  
C#31=SUPPLIER_PART_VERSION(#5,'AP210AD02',.T.,(#35,#37));  
C#32=ACCESS_CODE();  
C#33=EE_PRODUCT_DEFINITION(#30,'flasher_new','1255','used to drive LEDs at a 1.5 second  
duration',#34,(#21,#39),(#2,#9));  
C#34=DATE();  
C#35=EE_APPROVAL('Production',#2,.T.,#36);  
C#36=DATE();  
C#37=EE_APPROVAL('Design Review',#9,.T.,#38);  
C#38=DATE();  
C#39=EE_DOCUMENT($,#35,(#26),$,#40,#32,'PCB Data',#2);  
C#40=DATE();  
C#41=ENGINEERING_MAKE_FROM(#7,#33);  
ENDSEC;  
END-STEP_WORKING_SESSION;
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:::::::::::::
flasher
::::::::::::

STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION(("Test Population of a complete PCA"),' ');
FILE_NAME('flasher','1994-04-08 13:57:24','(James J. Kachamrsky),(Tobyhanna Army Depot)',
'dp_sum_86.01','');
FILE_SCHEMA(('Allo UoF','Cmdm UoF','Geom UoF','Part UoF','Pca UoF','Pcb UoF','Rqmt UoF','Util
UoF'));
ENDSEC;
DATA;
C#1=EE_PRODUCT('Flasher','Through Hole/Double Sided',#2,'AP210AD01',.F.,'assembly');
C#2=ORGANIZATION('Naval Air Warfare Center',\$);
C#3=EE_PRODUCT_VERSION(#1,#2,#4,\$,\$,#6,'A',.RELEASED.);
C#4=SUPPLIER_PART_VERSION(#5,'AP210AD001',.T.,(\$,\$));
C#5=SUPPLIER(#2,'02387');
C#6=ACCESS_CODE();
C#7=EE_PRODUCT_DEFINITION(#3,\$,'1234','used to drive LEDs at a specified
duration',#8,\$,(#2,#9));
C#8=DATE();
C#9=PERSON(#2,'Garland A. Borden III','?');
C#10=DESIGN_SPECIFICATION(\$,\$,(#14),\$,#11,#12,'MIL-R-39017E',#13,\$,#13);
C#11=DATE();
C#12=ACCESS_CODE();
C#13=ORGANIZATION('US Army Laboratory Command','ATTN: SLCET-R-S, Fort Monmouth, NJ,
07703-5000');
C#14=EE_TEXT('Military Specification for Film Resistors');
C#15=DESIGN_SPECIFICATION(\$,\$,(#18),\$,#16,#17,'MIL-C-39014E',#13,\$,#13);
C#16=DATE();
C#17=ACCESS_CODE();
C#18=EE_TEXT('Military Specification for Ceramic Capacitors');
C#19=DESIGN_SPECIFICATION(\$,\$,(#23),\$,#20,#21,'MIL-STD-1276E',#22,\$,#22);
C#20=DATE();
C#21=ACCESS_CODE();
C#22=ORGANIZATION('US Army Research Laboratory Command','ATTN: AMSRL-EP-RD, Fort
Monmouth, NJ, 07703-5000');
C#23=EE_TEXT('Military Standard on Leads for Electronic Component Parts');
C#24=PROCESS_SPECIFICATION(\$,\$,(#28),\$,#25,#26,'MIL-P-5510D',#27,\$,#27);
C#25=DATE();
C#26=ACCESS_CODE();
C#27=ORGANIZATION('US Army Electronic Research and Development Command','ATTN:
DELET-R, Fort Monmouth, NJ, 07703-5000');
C#28=EE_TEXT('Military Specification for Printed Wiring Boards');
C#29=DESIGN_SPECIFICATION(\$,\$,(#33),\$,#30,#31,'MIL-C-28809B',#32,\$,#32);
C#30=DATE();
C#31=ACCESS_CODE();
C#32=ORGANIZATION('Space and Naval Warfare Command','ATTN: SPAWAR-003-1212,

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Washington DC, 20363-5100');
C#33=EE_TEXT('Military Specification for Printed Wiring Assemblies');
C#34=MATERIAL_SPECIFICATION($,$,(#37),$,#35,#36,'QQ-S-571',#22,$,#22);
C#35=DATE();
C#36=ACCESS_CODE();
C#37=EE_TEXT('Military Specification for Solder');
C#38=MATERIAL_SPECIFICATION($,$,(#41),$,#39,#40,'MIL-F-14256',#22,$,#22);
C#39=DATE();
C#40=ACCESS_CODE();
C#41=EE_TEXT('Military Specification for Solder Flux');
C#42=DESIGN_SPECIFICATION($,$,(#45),$,#43,#44,'MIL-STD-1835',#32,$,#32);
C#43=DATE();
C#44=ACCESS_CODE();
C#45=EE_TEXT('Military Standard for Microcircuit Case Outlines');
C#46=PACKAGED_PART($,#47,(#48,#53),(#58),$,$,$,'RLR07C2202KM',$);
C#47=TECHNOLOGY('Passive Electronic Components','Film Deposition','?');
C#48=CHARACTERISTIC('resistance',#49,#52);
C#49=EE_TOLERANCE(#50,#51);
C#50=EE_MEASURE(19.8,'kohms');
C#51=EE_MEASURE(24.2,'kohms');
C#52=EE_MEASURE(22,'kohms');
C#53=CHARACTERISTIC('wattage',#54,#57);
C#54=EE_TOLERANCE(#55,#56);
C#55=EE_MEASURE(0.225,'watt');
C#56=EE_MEASURE(0.275,'watt');
C#57=EE_MEASURE(0.25,'watt');
C#58=COORDINATED_NUMERIC_PARAMETER((#59,#60),'voltage rating');
C#59=NUMERIC_PARAMETER(#52,'resistance',#49);
C#60=NUMERIC_PARAMETER(#57,'wattage',#54);
C#61=PACKAGED_PART($,#47,(#62,#53),(#67),$,$,$,'RLR07C1004KM',$);
C#62=CHARACTERISTIC('resistance',#63,#66);
C#63=EE_TOLERANCE(#64,#65);
C#64=EE_MEASURE(0.9,'Mohms');
C#65=EE_MEASURE(1.1,'Mohms');
C#66=EE_MEASURE(1,'Mohms');
C#67=COORDINATED_NUMERIC_PARAMETER((#68,#60),'voltage rating');
C#68=NUMERIC_PARAMETER(#66,'resistance',#63);
C#69=PACKAGED_PART($,#47,(#70,#53),(#75),$,$,$,'RLR07C2200KM',$);
C#70=CHARACTERISTIC('resistance',#71,#74);
C#71=EE_TOLERANCE(#72,#73);
C#72=EE_MEASURE(198,'ohms');
C#73=EE_MEASURE(242,'ohms');
C#74=EE_MEASURE(220,'ohms');
C#75=COORDINATED_NUMERIC_PARAMETER((#76,#60),'voltage rating');
C#76=NUMERIC_PARAMETER(#74,'resistance',#71);
C#77=PACKAGED_PART($,#78,(#79,#84),$,$,$,$,'M39014/2-1415',$);
C#78=TECHNOLOGY('Passive Electronic Components','Dielectric Sheeting','?');
C#79=CHARACTERISTIC('capacitance',#80,#83);
C#80=EE_TOLERANCE(#81,#82);

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C#81=EE_MEASURE(0.9,'ufarad');
C#82=EE_MEASURE(1.1,'ufarad');
C#83=EE_MEASURE(1,'ufarad');
C#84=CHARACTERISTIC('DC rated voltage',#85,#88);
C#85=EE_TOLERANCE(#86,#87);
C#86=EE_MEASURE(45,'volts');
C#87=EE_MEASURE(55,'volts');
C#88=EE_MEASURE(50,'volts');
C#89=PACKAGED_PART($,$,(#90,#95),$,,$,$,$,'M39014/1-1314',$);
C#90=CHARACTERISTIC('capacitance',#91,#94);
C#91=EE_TOLERANCE(#92,#93);
C#92=EE_MEASURE(0.009,'ufarad');
C#93=EE_MEASURE(0.011,'ufarad');
C#94=EE_MEASURE(0.01,'ufarad');
C#95=CHARACTERISTIC('DC rated voltage',$,#99);
C#96=EE_TOLERANCE(#97,#98);
C#97=EE_MEASURE(180,'volts');
C#98=EE_MEASURE(220,'volts');
C#99=EE_MEASURE(200,'volts');
C#100=PACKAGED_PART($,$,$,$,$,$,$,'SE555CN',$);
C#101=TECHNOLOGY('Bipolar Transistor','Ion Implantation','silicon');
C#102=LIBRARY_MODEL($,#103,(#106),$,#107,#108,'555',#104,#109,(#1028,#1036,#1042,#105
1,#1059));
C#103=EE_APPROVAL('Analog Simulation Model',#104,.T.,#105);
C#104=ORGANIZATION('Tobyhanna Army Depot','11 Midwat Road, ATTN: SDSTO-ME-F,
Tobyhanna, PA, 18466-5075');
C#105=DATE();
C#106=EE_TEXT('SABER model of a Signetics 555 timer');
C#107=DATE();
C#108=ACCESS_CODE();
C#109=LANGUAGE_REFERENCE_MANUAL($,#110,(#113),$,#114,$,'SABER',#111,$,#111);
C#110=EE_APPROVAL('General Use Analog Simulator',#111,.T.,#112);
C#111=ORGANIZATION('ANALOGY Inc.', 'PO Box 1669, Beaverton, OR, 97075-1669');
C#112=DATE();
C#113=EE_TEXT('General Use Analog Simulator');
C#114=DATE();
C#1018=CHARACTERISTIC('Supply Voltage',#1019,#1022);
C#1019=EE_TOLERANCE(#1020,#1021);
C#1020=EE_MEASURE(4.5,'volts');
C#1021=EE_MEASURE(18,'volts');
C#1022=EE_MEASURE(5,'volts');
C#1023=CHARACTERISTIC('Control voltage',#1024,#1027);
C#1024=EE_TOLERANCE(#1025,#1026);
C#1025=EE_MEASURE(2.9,'volts');
C#1026=EE_MEASURE(3.8,'volts');
C#1027=EE_MEASURE(3.33,'volts');
C#1028=COORDINATED_CHARACTERISTIC((#1023,#1029),'Control voltage at the Test Supply
Voltage');
C#1029=CHARACTERISTIC('Test Supply Voltage',#1030,#1031);

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C#1030=EE_TOLERANCE(#1031,$);
C#1031=EE_MEASURE(5,'volts');
C#1032=CHARACTERISTIC('Threshold Voltage',#1033,#1027);
C#1033=EE_TOLERANCE(#1034,#1035);
C#1034=EE_MEASURE(2.7,'volts');
C#1035=EE_MEASURE(4,'volts');
C#1036=COORDINATED_CHARACTERISTIC((#1032,#1029),'Threshold voltage at the Test Supply
Voltage');
C#1037=CHARACTERISTIC('Trigger voltage',#1038,#1041);
C#1038=EE_TOLERANCE(#1039,#1040);
C#1039=EE_MEASURE(1.42,'volts');
C#1040=EE_MEASURE(1.9,'volts');
C#1041=EE_MEASURE(1.67,'volts');
C#1042=COORDINATED_CHARACTERISTIC((#1037,#1029),'Trigger voltage at the Test Supply
Voltage');
C#1043=CHARACTERISTIC('Test Sink current',#1044,#1045);
C#1044=EE_TOLERANCE(#1045,#1045);
C#1045=EE_MEASURE(5,'miliAmps');
C#1046=CHARACTERISTIC('Output voltage low state',#1047,#1050);
C#1047=EE_TOLERANCE(#1048,#1049);
C#1048=EE_MEASURE(0,'volts');
C#1049=EE_MEASURE(0.2,'volts');
C#1050=EE_MEASURE(0.05,'volts');
C#1051=COORDINATED_CHARACTERISTIC((#1043,#1029,#1046),'Low voltage at the Test Supply
Voltage and Sink Current');
C#1052=CHARACTERISTIC('Test source current',#1053,#1054);
C#1053=EE_TOLERANCE(#1054,#1054);
C#1054=EE_MEASURE(100,'miliAmps');
C#1055=CHARACTERISTIC('Output voltage high state',#1056,#1058);
C#1056=EE_TOLERANCE(#1057,#1031);
C#1057=EE_MEASURE(3,'volts');
C#1058=EE_MEASURE(3.3,'volts');
C#1059=COORDINATED_CHARACTERISTIC((#1052,#1029,#1055),'High State voltage at the Test
Supply Voltage and Source Current');
C#1060=CHARACTERISTIC('Output rise time',#1061,#1064);
C#1061=EE_TOLERANCE(#1062,#1063);
C#1062=EE_MEASURE(0,'nanosecond');
C#1063=EE_MEASURE(200,'nanosecond');
C#1064=EE_MEASURE(100,'nanosecond');
C#1065=CHARACTERISTIC('Output fall time',#1066,#1064);
C#1066=EE_TOLERANCE(#1062,#1063);
C#1067=PACKAGED_COMPONENT(#46,$,$,$,'R1');
C#1068=PACKAGED_COMPONENT(#61,$,$,$,'R2');
C#1069=PACKAGED_COMPONENT(#69,$,$,$,'R3');
C#1070=PACKAGED_COMPONENT(#69,$,$,$,'R4');
C#1071=PACKAGED_COMPONENT(#69,$,$,$,'R5');
C#1072=PACKAGED_COMPONENT(#69,$,$,$,'R6');
C#1073=PACKAGED_COMPONENT(#77,$,$,$,'C1');
C#1074=PACKAGED_COMPONENT(#89,$,$,$,'C2');
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C#1075=PACKAGED_COMPONENT(#100,$,$,$,'U1');
C#1076=PACKAGING_SPECIFIED_PLACEMENT(#1085);
C#1077=PACKAGING_SPECIFIED_PLACEMENT(#1091);
C#1078=PACKAGING_SPECIFIED_PLACEMENT(#1096);
C#1079=PACKAGING_SPECIFIED_PLACEMENT(#1101);
C#1080=PACKAGING_SPECIFIED_PLACEMENT(#1104);
C#1081=PACKAGING_SPECIFIED_PLACEMENT(#1107);
C#1082=PACKAGING_SPECIFIED_PLACEMENT(#1109);
C#1083=PACKAGING_SPECIFIED_PLACEMENT(#1112);
C#1084=PACKAGING_SPECIFIED_PLACEMENT(#1114);
C#1085=AXIS_PLACEMENT(#1086,#1087);
C#1086=ORIENTATION((1,0,0));
C#1087=CARTESIAN_POINT((#1088,#1089,#1090));
C#1088=EE_MEASURE(0.75,'inches');
C#1089=EE_MEASURE(0.425,'inches');
C#1090=EE_MEASURE(0,'inches');
C#1091=AXIS_PLACEMENT(#1092,#1093);
C#1092=ORIENTATION((-1,0,0));
C#1093=CARTESIAN_POINT((#1094,#1095,#1090));
C#1094=EE_MEASURE(0.85,'inches');
C#1095=EE_MEASURE(-0.025,'inches');
C#1096=AXIS_PLACEMENT(#1097,#1098);
C#1097=ORIENTATION((0,-1,0));
C#1098=CARTESIAN_POINT((#1099,#1100,#1090));
C#1099=EE_MEASURE(0.65,'inches');
C#1100=EE_MEASURE(0.275,'inches');
C#1101=AXIS_PLACEMENT(#1097,#1102);
C#1102=CARTESIAN_POINT((#1099,#1103,#1090));
C#1103=EE_MEASURE(0.175,'inches');
C#1104=AXIS_PLACEMENT(#1097,#1105);
C#1105=CARTESIAN_POINT((#1099,#1106,#1090));
C#1106=EE_MEASURE(0.075,'inches');
C#1107=AXIS_PLACEMENT(#1097,#1108);
C#1108=CARTESIAN_POINT((#1099,#1095,#1090));
C#1109=AXIS_PLACEMENT(#1097,#1110);
C#1110=CARTESIAN_POINT((#1106,#1089,#1090));
C#1112=AXIS_PLACEMENT(#1097,#1113);
C#1113=CARTESIAN_POINT((#1100,#1089,#1090));
C#1114=AXIS_PLACEMENT(#1115,#1116);
C#1115=ORIENTATION((0,1,0));
C#1116=CARTESIAN_POINT((#1117,#1100,#1090));
C#1117=EE_MEASURE(0.25,'inches');
C#1118=COMPONENT_ASSY_RELATIONSHIP(#1076,#1130,#1067,#1119);
C#1119=EE_MEASURE(0.01,'inches');
C#1120=COMPONENT_ASSY_RELATIONSHIP(#1077,#1130,#1068,#1119);
C#1121=COMPONENT_ASSY_RELATIONSHIP(#1078,#1130,#1069,#1122);
C#1122=EE_MEASURE(0.235,'inches');
C#1123=COMPONENT_ASSY_RELATIONSHIP(#1079,#1130,#1070,#1122);
C#1124=COMPONENT_ASSY_RELATIONSHIP(#1080,#1130,#1071,#1122);
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C#1125=COMPONENT_ASSY_RELATIONSHIP(#1081,#1130,#1072,#1122);
C#1126=COMPONENT_ASSY_RELATIONSHIP(#1082,#1130,#1073,#1119);
C#1127=COMPONENT_ASSY_RELATIONSHIP(#1083,#1130,#1074,#1119);
C#1128=COMPONENT_ASSY_RELATIONSHIP(#1084,#1130,#1075,#1129);
C#1129=EE_MEASURE(0.015,'inches');
C#1130=PCA($,$,$,$,$,$,$,'AP210AD01',(#10,#15,#19,#24,#29,#34,#38,#42));
C#1131=COMPONENT_TERMINATION_PASSAGE(.T.,#1132,#1142,#1145,#1148);
C#1132=DESIGN_LAYER_STRATUM((#1133),'Component
Side','Copper',#1138,#1141,'conduction');
C#1133=PCB_CURVE_LOOP(.T.,#1134,(#1137));
C#1134=EE_TOLERANCE(#1135,#1136);
C#1135=EE_MEASURE(0,'inches');
C#1136=EE_MEASURE(0,'inches');
C#1137=CURVE();
C#1138=EE_TOLERANCE(#1139,#1140);
C#1139=EE_MEASURE(0.005,'inches');
C#1140=EE_MEASURE(0.007,'inches');
C#1141=EE_MEASURE(0.006,'inches');
C#1142=DESIGN_LAYER_STRATUM((#1143),'Solder Side','Copper',#1138,#1141,'conduction');
C#1143=PCB_CURVE_LOOP(.T.,#1134,(#1144));
C#1144=CURVE();
C#1145=EE_TOLERANCE(#1146,#1147);
C#1146=EE_MEASURE(0.027,'inches');
C#1147=EE_MEASURE(0.029,'inches');
C#1148=PCB_CURVE_LOOP(.T.,#1145,(#1149));
C#1149=CURVE();
C#1150=COMPONENT_TERMINATION_PASSAGE(.T.,#1132,#1142,#1145,#1151);
C#1151=PCB_CURVE_LOOP(.T.,#1145,(#1152));
C#1152=CURVE();
C#1153=COMPONENT_TERMINATION_PASSAGE(.T.,#1132,#1142,#1145,#1154);
C#1154=PCB_CURVE_LOOP(.T.,#1145,(#1155));
C#1155=CURVE();
C#1156=COMPONENT_TERMINATION_PASSAGE(.T.,#1132,#1142,#1145,#1157);
C#1157=PCB_CURVE_LOOP(.T.,#1145,(#1158));
C#1158=CURVE();
C#1159=COMPONENT_TERMINATION_PASSAGE(.T.,#1132,#1142,#1145,#1160);
C#1160=PCB_CURVE_LOOP(.T.,#1145,(#1161));
C#1161=CURVE();
C#1162=COMPONENT_TERMINATION_PASSAGE(.T.,#1132,#1142,#1145,#1163);
C#1163=PCB_CURVE_LOOP(.T.,#1145,(#1164));
C#1164=CURVE();
C#1165=COMPONENT_TERMINATION_PASSAGE(.T.,#1132,#1142,#1145,#1166);
C#1166=PCB_CURVE_LOOP(.T.,#1145,(#1167));
C#1167=CURVE();
C#1168=COMPONENT_TERMINATION_PASSAGE(.T.,#1132,#1142,#1145,#1169);
C#1169=PCB_CURVE_LOOP(.T.,#1145,(#1170));
C#1170=CURVE();
C#1171=COMPONENT_TERMINATION_PASSAGE(.T.,#1132,#1142,#1145,#1172);
C#1172=PCB_CURVE_LOOP(.T.,#1145,(#1173));
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C#1173=CURVE0;
C#1174=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1175);
C#1175=PCB_CURVE_LOOP(T.,#1145,(#1176));
C#1176=CURVE0;
C#1177=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1178);
C#1178=PCB_CURVE_LOOP(T.,#1145,(#1179));
C#1179=CURVE0;
C#1180=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1181);
C#1181=PCB_CURVE_LOOP(T.,#1145,(#1185));
C#1182=CURVE0;
C#1183=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1184);
C#1184=PCB_CURVE_LOOP(T.,#1145,(#1185));
C#1185=CURVE0;
C#1186=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1187);
C#1187=PCB_CURVE_LOOP(T.,#1145,(#1188));
C#1188=CURVE0;
C#1189=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1190);
C#1190=PCB_CURVE_LOOP(T.,#1145,(#1191));
C#1191=CURVE0;
C#1192=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1193);
C#1193=PCB_CURVE_LOOP(T.,#1145,(#1194));
C#1194=CURVE0;
C#1195=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1196);
C#1196=PCB_CURVE_LOOP(T.,#1145,(#1197));
C#1197=CURVE0;
C#1198=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1199);
C#1199=PCB_CURVE_LOOP(T.,#1145,(#1200));
C#1200=CURVE0;
C#1201=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1202);
C#1202=PCB_CURVE_LOOP(T.,#1145,(#1203));
C#1203=CURVE0;
C#1204=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1205);
C#1205=PCB_CURVE_LOOP(T.,#1145,(#1206));
C#1206=CURVE0;
C#1207=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1208);
C#1208=PCB_CURVE_LOOP(T.,#1145,(#1209));
C#1209=CURVE0;
C#1210=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1211);
C#1211=PCB_CURVE_LOOP(T.,#1145,(#1212));
C#1212=CURVE0;
C#1213=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1214);
C#1214=PCB_CURVE_LOOP(T.,#1145,(#1215));
C#1215=CURVE0;
C#1216=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1217);
C#1217=PCB_CURVE_LOOP(T.,#1145,(#1218));
C#1218=CURVE0;
C#1219=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1220);
C#1220=PCB_CURVE_LOOP(T.,#1145,(#1221));
C#1221=CURVE0;
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C#1222=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1223);
C#1223=PCB_CURVE_LOOP(T.,#1145,(#1224));
C#1224=CURVE0;
C#1225=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1226);
C#1226=PCB_CURVE_LOOP(T.,#1145,(#1227));
C#1227=CURVE0;
C#1228=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1229);
C#1229=PCB_CURVE_LOOP(T.,#1145,(#1230));
C#1230=CURVE0;
C#1231=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1232);
C#1232=PCB_CURVE_LOOP(T.,#1145,(#1233));
C#1233=CURVE0;
C#1234=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1235);
C#1235=PCB_CURVE_LOOP(T.,#1145,(#1236));
C#1236=CURVE0;
C#1237=COMPONENT_TERMINATION_PASSAGE(T.,#1132,#1142,#1145,#1238);
C#1238=PCB_CURVE_LOOP(T.,#1145,(#1239));
C#1239=CURVE0;
C#1240=PASSEAGE_COMPONENT_RELATIONSHIP(#1168,#1067);
C#1241=PASSEAGE_COMPONENT_RELATIONSHIP(#1171,#1067);
C#1242=PASSEAGE_COMPONENT_RELATIONSHIP(#1174,#1068);
C#1243=PASSEAGE_COMPONENT_RELATIONSHIP(#1177,#1068);
C#1244=PASSEAGE_COMPONENT_RELATIONSHIP(#1180,#1069);
C#1245=PASSEAGE_COMPONENT_RELATIONSHIP(#1183,#1069);
C#1246=PASSEAGE_COMPONENT_RELATIONSHIP(#1186,#1070);
C#1247=PASSEAGE_COMPONENT_RELATIONSHIP(#1189,#1070);
C#1248=PASSEAGE_COMPONENT_RELATIONSHIP(#1192,#1071);
C#1249=PASSEAGE_COMPONENT_RELATIONSHIP(#1195,#1071);
C#1250=PASSEAGE_COMPONENT_RELATIONSHIP(#1198,#1072);
C#1251=PASSEAGE_COMPONENT_RELATIONSHIP(#1201,#1072);
C#1252=PASSEAGE_COMPONENT_RELATIONSHIP(#1204,#1073);
C#1253=PASSEAGE_COMPONENT_RELATIONSHIP(#1207,#1073);
C#1254=PASSEAGE_COMPONENT_RELATIONSHIP(#1210,#1074);
C#1255=PASSEAGE_COMPONENT_RELATIONSHIP(#1213,#1074);
C#1256=PASSEAGE_COMPONENT_RELATIONSHIP(#1216,#1075);
C#1257=PASSEAGE_COMPONENT_RELATIONSHIP(#1219,#1075);
C#1258=PASSEAGE_COMPONENT_RELATIONSHIP(#1222,#1075);
C#1259=PASSEAGE_COMPONENT_RELATIONSHIP(#1225,#1075);
C#1260=PASSEAGE_COMPONENT_RELATIONSHIP(#1228,#1075);
C#1261=PASSEAGE_COMPONENT_RELATIONSHIP(#1231,#1075);
C#1262=PASSEAGE_COMPONENT_RELATIONSHIP(#1234,#1075);
C#1263=PASSEAGE_COMPONENT_RELATIONSHIP(#1237,#1075);
C#1273=PASSEAGE_COMPONENT_RELATIONSHIP(#1131,#1540);
C#1274=PASSEAGE_COMPONENT_RELATIONSHIP(#1150,#1540);
C#1275=PASSEAGE_COMPONENT_RELATIONSHIP(#1153,#1540);
C#1276=PASSEAGE_COMPONENT_RELATIONSHIP(#1156,#1540);
C#1277=PASSEAGE_COMPONENT_RELATIONSHIP(#1159,#1540);
C#1278=PASSEAGE_COMPONENT_RELATIONSHIP(#1162,#1540);
C#1279=PASSEAGE_COMPONENT_RELATIONSHIP(#1165,#1540);
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C#1281=PACKAGED_COMPONENT_TERMINATION(#1067,#1283);
C#1282=PACKAGED_COMPONENT_TERMINATION(#1067,#1315);
C#1283=PACKAGED_PART_TERMINATION(#1284,#1291,.T.,#46,'ONE');
C#1284=PHYSICAL_DEVICE_PORT(#1285,'one',(##1286));
C#1285=EE_DEVICE($,$,$,$,$,$,$,$,'rlr072202');
C#1286=PCB_CURVE_LOOP(.T.,#1287,(#1290));
C#1287=EE_TOLERANCE(#1288,#1289);
C#1288=EE_MEASURE(0.001,'inches');
C#1289=EE_MEASURE(0.002,'inches');
C#1290=CURVE0;
C#1291=PACKAGE_TERMINATION(#1292,#1306,#1308,#1314);
C#1292=PREPARED_TERMINAL($,$,$,$,$,$,#1293,#1298,$,#1300,#1301);
C#1293=PCB_CURVE_LOOP(.T.,#1294,(#1297));
C#1294=EE_TOLERANCE(#1295,#1296);
C#1295=EE_MEASURE(0.023,'inches');
C#1296=EE_MEASURE(0.027,'inches');
C#1297=CURVE0;
C#1298=PCB_CURVE_LOOP(.T.,#1294,(#1299));
C#1299=CURVE0;
C#1300=EE_MATERIAL($,'Copper Nickel Tin 725 alloy',$,$,#19);
C#1301=TERMINAL($,$,$,$,$,$,#1302,#1304,$,#1300);
C#1302=PCB_CURVE_LOOP(.T.,#1294,(#1303));
C#1303=CURVE0;
C#1304=PCB_CURVE_LOOP(.T.,#1294,(#1305));
C#1305=CURVE0;
C#1306=PACKAGE_BODY($,$,$,$,$,$,$,#1307);
C#1307=EE_MATERIAL($,'plastic',$,$,#10);
C#1308=AXIS_PLACEMENT(#1309,#1310);
C#1309=ORIENTATION((1,0,0));
C#1310=CARTESIAN_POINT((#1311,#1312,#1313));
C#1311=EE_MEASURE(0,'inches');
C#1312=EE_MEASURE(0.045,'inches');
C#1313=EE_MEASURE(0.045,'inches');
C#1314=PACKAGE($,$,$,$,$,$,'rlr07');
C#1315=PACKAGED_PART_TERMINATION(#1316,#1319,.F.,#46,'TWO');
C#1316=PHYSICAL_DEVICE_PORT(#1285,'two',(##1317));
C#1317=PCB_CURVE_LOOP(.T.,#1287,(#1318));
C#1318=CURVE0;
C#1319=PACKAGE_TERMINATION(#1320,#1306,#1325,#1314);
C#1320=PREPARED_TERMINAL($,$,$,$,$,$,#1321,#1323,$,#1300,#1301);
C#1321=PCB_CURVE_LOOP(.T.,#1294,(#1322));
C#1322=CURVE0;
C#1323=PCB_CURVE_LOOP(.T.,#1294,(#1324));
C#1324=CURVE0;
C#1325=AXIS_PLACEMENT(#1326,#1327);
C#1326=ORIENTATION((-1,0,0));
C#1327=CARTESIAN_POINT((#1328,#1312,#1313));
C#1328=EE_MEASURE(0.25,'inches');
C#1329=PACKAGED_COMPONENT_TERMINATION(#1068,#1478);
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C#1331=PACKAGED_COMPONENT_TERMINATION(#1068,#1482);
C#1333=PACKAGED_COMPONENT_TERMINATION(#1069,#1471);
C#1336=PREPARED_TERMINAL(\$,\$,\$,\$,\$,\$,#1337,#1339,\$,#1300,#1301);
C#1337=PCB_CURVE_LOOP(.T.,#1294,(#1338));
C#1338=CURVE();
C#1339=PCB_CURVE_LOOP(.T.,#1294,(#1340));
C#1340=CURVE();
C#1341=PACKAGED_COMPONENT_TERMINATION(#1069,#1475);
C#1344=PREPARED_TERMINAL(\$,\$,\$,\$,\$,\$,#1345,#1347,\$,#1300,#1301);
C#1345=PCB_CURVE_LOOP(.T.,#1294,(#1346));
C#1346=CURVE();
C#1347=PCB_CURVE_LOOP(.T.,#1294,(#1348));
C#1348=CURVE();
C#1349=PACKAGED_COMPONENT_TERMINATION(#1070,#1471);
C#1352=PACKAGED_COMPONENT_TERMINATION(#1070,#1475);
C#1354=PACKAGED_COMPONENT_TERMINATION(#1071,#1471);
C#1355=PACKAGED_COMPONENT_TERMINATION(#1071,#1475);
C#1356=PACKAGED_COMPONENT_TERMINATION(#1072,#1471);
C#1357=PACKAGED_COMPONENT_TERMINATION(#1072,#1475);
C#1358=PACKAGED_COMPONENT_TERMINATION(#1073,#1359);
C#1359=PACKAGED_PART_TERMINATION(#1360,#1364,.T.,#77,'ONE');
C#1360=PHYSICAL_DEVICE_PORT(#1361,'one',(#1362));
C#1361=EE_DEVICE(\$,\$,\$,\$,\$,\$,\$,'m39014/2-1415');
C#1362=PCB_CURVE_LOOP(.T.,#1287,(#1363));
C#1363=CURVE();
C#1364=PACKAGE_TERMINATION(#1365,#1378,#1380,#1386);
C#1365=PREPARED_TERMINAL(\$,\$,\$,\$,\$,\$,#1366,#1371,\$,#1300,#1373);
C#1366=PCB_CURVE_LOOP(.T.,#1367,(#1370));
C#1367=EE_TOLERANCE(#1368,#1369);
C#1368=EE_MEASURE(0.023,'inches');
C#1369=EE_MEASURE(0.029,'inches');
C#1370=CURVE();
C#1371=PCB_CURVE_LOOP(.T.,#1367,(#1372));
C#1372=CURVE();
C#1373=TERMINAL(\$,\$,\$,\$,\$,\$,#1374,#1376,\$,#1300);
C#1374=PCB_CURVE_LOOP(.T.,#1367,(#1375));
C#1375=CURVE();
C#1376=PCB_CURVE_LOOP(.T.,#1367,(#1377));
C#1377=CURVE();
C#1378=PACKAGE_BODY(\$,\$,\$,\$,\$,\$,\$,#1379);
C#1379=EE_MATERIAL(\$,'plastic',\$,\$,#15);
C#1380=AXIS_PLACEMENT(#1381,#1382);
C#1381=ORIENTATION((0,1,0));
C#1382=CARTESIAN_POINT((#1383,#1384,#1385));
C#1383=EE_MEASURE(-0.1,'inches');
C#1384=EE_MEASURE(0,'inches');
C#1385=EE_MEASURE(-0.045,'inches');
C#1386=PACKAGE(\$,\$,\$,\$,\$,\$,'ncc62');
C#1387=PACKAGED_PART_TERMINATION(#1388,#1391,.F.,#77,'TWO');

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C#1388=PHYSICAL_DEVICE_PORT(#1361,'two',(#1389));
C#1389=PCB_CURVE_LOOP(.T.,#1287,(#1390));
C#1390=CURVE0;
C#1391=PACKAGE_TERMINATION(#1392,#1378,#1397,#1386);
C#1392=PREPARED_TERMINAL($,$,$,$,$,$,#1393,#1395,$,#1300,#1373);
C#1393=PCB_CURVE_LOOP(.T.,#1367,(#1394));
C#1394=CURVE0;
C#1395=PCB_CURVE_LOOP(.T.,#1367,(#1396));
C#1396=CURVE0;
C#1397=AXIS_PLACEMENT(#1381,#1398);
C#1398=CARTESIAN_POINT((#1399,#1384,#1385));
C#1399=EE_MEASURE(0.1,'inches');
C#1400=PACKAGED_PART_TERMINATION(#1401,#1403,.T.,#100,'ONE');
C#1401=PHYSICAL_DEVICE_PORT(#1402,'gnd',$);
C#1402=EE_DEVICE($,$,$,$,$,$,$,'555');
C#1403=PACKAGE_TERMINATION(#1404,#1416,#1418,#1424);
C#1404=PREPARED_TERMINAL($,$,$,$,$,$,#1405,#1410,$,#1300,#1415);
C#1405=PCB_CURVE_LOOP(.T.,#1406,(#1409));
C#1406=EE_TOLERANCE(#1407,#1408);
C#1407=EE_MEASURE(0.014,'inches');
C#1408=EE_MEASURE(0.023,'inches');
C#1409=CURVE0;
C#1410=PCB_CURVE_LOOP(.T.,#1411,(#1414));
C#1411=EE_TOLERANCE(#1412,#1413);
C#1412=EE_MEASURE(0.045,'inches');
C#1413=EE_MEASURE(0.065,'inches');
C#1414=CURVE0;
C#1415=TERMINAL($,$,$,$,$,$,#1405,#1410,$,#1300);
C#1416=PACKAGE_BODY($,$,$,$,$,$,#1417);
C#1417=EE_MATERIAL($,'ceramic',$,$,$);
C#1418=AXIS_PLACEMENT(#1419,#1420);
C#1419=ORIENTATION((1,0,0));
C#1420=CARTESIAN_POINT((#1421,#1422,#1423));
C#1421=EE_MEASURE(0.005,'inches');
C#1422=EE_MEASURE(0.015,'inches');
C#1423=EE_MEASURE(0.085,'inches');
C#1424=PACKAGE($,$,$,$,$,$,'dip 8');
C#1425=PACKAGED_PART_TERMINATION(#1426,#1427,.F.,#100,'TWO');
C#1426=PHYSICAL_DEVICE_PORT(#1402,'trigger',$);
C#1427=PACKAGE_TERMINATION(#1404,#1416,#1428,#1424);
C#1428=AXIS_PLACEMENT(#1419,#1429);
C#1429=CARTESIAN_POINT((#1430,#1422,#1423));
C#1430=EE_MEASURE(0.105,'inches');
C#1431=PACKAGED_PART_TERMINATION(#1432,#1433,.F.,#100,'THREE');
C#1432=PHYSICAL_DEVICE_PORT(#1402,'output',$);
C#1433=PACKAGE_TERMINATION(#1404,#1416,#1434,#1424);
C#1434=AXIS_PLACEMENT(#1419,#1435);
C#1435=CARTESIAN_POINT((#1436,#1422,#1423));
C#1436=EE_MEASURE(0.205,'inches');

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C#1437=PACKAGED_PART_TERMINATION(#1438,#1439,.F.,#100,'FOUR');
C#1438=PHYSICAL_DEVICE_PORT(#1402,'reset',S);
C#1439=PACKAGE_TERMINATION(#1404,#1416,#1440,#1424);
C#1440=AXIS_PLACEMENT(#1419,#1441);
C#1441=CARTESIAN_POINT((#1442,#1422,#1423));
C#1442=EE_MEASURE(0.305,'inches');
C#1443=PACKAGED_PART_TERMINATION(#1444,#1445,.F.,#100,'FIVE');
C#1444=PHYSICAL_DEVICE_PORT(#1402,'control voltage',S);
C#1445=PACKAGE_TERMINATION(#1404,#1416,#1446,#1424);
C#1446=AXIS_PLACEMENT(#1419,#1447);
C#1447=CARTESIAN_POINT((#1442,#1422,#1448));
C#1448=EE_MEASURE(0.14,'inches');
C#1449=PACKAGED_PART_TERMINATION(#1450,#1451,.F.,#100,'SIX');
C#1450=PHYSICAL_DEVICE_PORT(#1402,'threshold',S);
C#1451=PACKAGE_TERMINATION(#1404,#1416,#1452,#1424);
C#1452=AXIS_PLACEMENT(#1419,#1453);
C#1453=CARTESIAN_POINT((#1436,#1422,#1448));
C#1454=PACKAGED_PART_TERMINATION(#1455,#1456,.F.,#100,'SEVEN');
C#1455=PHYSICAL_DEVICE_PORT(#1402,'discharge',S);
C#1456=PACKAGE_TERMINATION(#1404,#1416,#1457,#1424);
C#1457=AXIS_PLACEMENT(#1419,#1458);
C#1458=CARTESIAN_POINT((#1430,#1422,#1448));
C#1459=PACKAGED_PART_TERMINATION(#1460,#1461,.F.,#100,'EIGHT');
C#1460=PHYSICAL_DEVICE_PORT(#1402,'vcc',S);
C#1461=PACKAGE_TERMINATION(#1404,#1416,#1462,#1424);
C#1462=AXIS_PLACEMENT(#1419,#1463);
C#1463=CARTESIAN_POINT((#1421,#1422,#1448));
C#1464=PACKAGED_PART_TERMINATION(#1465,#1467,.T.,#89,'ONE');
C#1465=PHYSICAL_DEVICE_PORT(#1466,'one',(##1362));
C#1466=EE_DEVICE($,$,$,$,$,$,$,$,'m39014/1-1314');
C#1467=PACKAGE_TERMINATION(#1365,#1378,#1380,#1386);
C#1468=PACKAGED_PART_TERMINATION(#1469,#1470,.F.,#89,'TWO');
C#1469=PHYSICAL_DEVICE_PORT(#1466,'two',(##1389));
C#1470=PACKAGE_TERMINATION(#1392,#1378,#1397,#1386);
C#1471=PACKAGED_PART_TERMINATION(#1472,#1474,.T.,#69,'ONE');
C#1472=PHYSICAL_DEVICE_PORT(#1473,'one',(##1286));
C#1473=EE_DEVICE($,$,$,$,$,$,$,$,'rlr072200');
C#1474=PACKAGE_TERMINATION(#1336,#1306,#1308,#1314);
C#1475=PACKAGED_PART_TERMINATION(#1476,#1477,.F.,#69,'TWO');
C#1476=PHYSICAL_DEVICE_PORT(#1473,'two',(##1317));
C#1477=PACKAGE_TERMINATION(#1320,#1306,#1325,#1314);
C#1478=PACKAGED_PART_TERMINATION(#1479,#1481,.T.,#61,'ONE');
C#1479=PHYSICAL_DEVICE_PORT(#1480,'one',(##1286));
C#1480=EE_DEVICE($,$,$,$,$,$,$,$,'rlr071004');
C#1481=PACKAGE_TERMINATION(#1344,#1306,#1308,#1314);
C#1482=PACKAGED_PART_TERMINATION(#1483,#1484,.F.,#61,'TWO');
C#1483=PHYSICAL_DEVICE_PORT(#1480,'two',(##1317));
C#1484=PACKAGE_TERMINATION(#1320,#1306,#1325,#1314);
C#1485=PACKAGING_RELATIONSHIP($,#46,S,#1285);

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C#1486=PACKAGING_RELATIONSHIP(\$,#61,\$,#1480);
C#1487=PACKAGING_RELATIONSHIP(\$,#69,\$,#1473);
C#1488=PACKAGING_RELATIONSHIP(\$,#77,\$,#1361);
C#1489=PACKAGING_RELATIONSHIP(\$,#89,\$,#1466);
C#1490=PACKAGING_RELATIONSHIP(\$,#100,\$,#1402);
C#1491=PACKAGED_COMPONENT_TERMINATION(#1073,#1387);
C#1492=PACKAGED_COMPONENT_TERMINATION(#1075,#1400);
C#1493=PACKAGED_COMPONENT_TERMINATION(#1075,#1425);
C#1494=PACKAGED_COMPONENT_TERMINATION(#1075,#1431);
C#1495=PACKAGED_COMPONENT_TERMINATION(#1075,#1437);
C#1496=PACKAGED_COMPONENT_TERMINATION(#1075,#1443);
C#1497=PACKAGED_COMPONENT_TERMINATION(#1075,#1449);
C#1498=PACKAGED_COMPONENT_TERMINATION(#1075,#1454);
C#1499=PACKAGED_COMPONENT_TERMINATION(#1075,#1459);
C#1500=PACKAGED_COMPONENT_TERMINATION(#1074,#1464);
C#1501=PACKAGED_COMPONENT_TERMINATION(#1074,#1468);
I#1502=PHYSICAL_CONNECTIVITY_DEFINITION((#1130),\$,S,'net 1',(#1341,#1542));
I#1503=PHYSICAL_CONNECTIVITY_DEFINITION((#1130),\$,S,'net 2',(#1352,#1543));
I#1504=PHYSICAL_CONNECTIVITY_DEFINITION((#1130),\$,S,'net 3',(#1355,#1545));
I#1505=PHYSICAL_CONNECTIVITY_DEFINITION((#1130),\$,S,'net 4',(#1357,#1546));
I#1506=PHYSICAL_CONNECTIVITY_DEFINITION((#1130),\$,S,'net 5',(#1494,#1544));
I#1507=PHYSICAL_CONNECTIVITY_DEFINITION((#1130),\$,S,'net
6',(#1495,#1333,#1341,#1499,#1281));
I#1508=PHYSICAL_CONNECTIVITY_DEFINITION((#1130),\$,S,'net 7',(#1497,#1493,#1331,#1358));
I#1509=PHYSICAL_CONNECTIVITY_DEFINITION((#1130),\$,S,'net 8',(#1496,#1500));
I#1510=PHYSICAL_CONNECTIVITY_DEFINITION((#1130),\$,S,'net 9',(#1498,#1282,#1329));
I#1511=PHYSICAL_CONNECTIVITY_DEFINITION((#1130),\$,S,'gnd',(#1492,#1547,#1492,#1491,#1
501,#1354,#1356));
C#1512=PACKAGED_PART_TERMINATION(#1513,#1515,.T.,#1539,'E1');
C#1513=PHYSICAL_DEVICE_PORT(#1514,'main power vcc',\$);
C#1514=EE_DEVICE(\$,S,S,S,S,S,S,\$,'flasher');
C#1515=PACKAGE_TERMINATION(#1516,#1518,#1693,#1520);
C#1516=PREPARED_TERMINAL(\$,S,S,S,S,S,\$, #1148,#1148,\$,#1696,#1517);
C#1517=TERMINAL(\$,S,S,S,S,S,\$, #1148,#1148,\$,#1696);
C#1518=PACKAGE_BODY(\$,S,S,S,S,S,\$,#1519);
C#1519=EE_MATERIAL(\$,'composite',S,S,\$);
C#1520=PACKAGE(\$,S,S,S,S,S,\$,'bare board');
C#1521=PACKAGED_PART_TERMINATION(#1522,#1523,.F.,#1539,'E2');
C#1522=PHYSICAL_DEVICE_PORT(#1514,'led 1 anode',\$);
C#1523=PACKAGE_TERMINATION(#1516,#1518,#1697,#1520);
C#1524=PACKAGED_PART_TERMINATION(#1525,#1526,.F.,#1539,'E3');
C#1525=PHYSICAL_DEVICE_PORT(#1514,'led 2 anode',\$);
C#1526=PACKAGE_TERMINATION(#1516,#1518,#1699,#1520);
C#1527=PACKAGED_PART_TERMINATION(#1528,#1529,.F.,#1539,'E4');
C#1528=PHYSICAL_DEVICE_PORT(#1514,'led 1 to 4 cathode',\$);
C#1529=PACKAGE_TERMINATION(#1516,#1518,#1701,#1520);
C#1530=PACKAGED_PART_TERMINATION(#1531,#1532,.F.,#1539,'E5');
C#1531=PHYSICAL_DEVICE_PORT(#1514,'led 3 anode',\$);
C#1532=PACKAGE_TERMINATION(#1516,#1518,#1703,#1520);

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C#1533=PACKAGED_PART_TERMINATION(#1534,#1535,.F.,#1539,'E6');
C#1534=PHYSICAL_DEVICE_PORT(#1514,'led 4 anode',S);
C#1535=PACKAGE_TERMINATION(#1516,#1518,#1705,#1520);
C#1536=PACKAGED_PART_TERMINATION(#1537,#1538,.F.,#1539,'E7');
C#1537=PHYSICAL_DEVICE_PORT(#1514,'ground',S);
C#1538=PACKAGE_TERMINATION(#1516,#1518,#1707,#1520);
C#1539=PACKAGED_PART($,$,$,$,$,$,$,'AP210AD01',S);
C#1540=PACKAGED_COMPONENT(#1539,$,$,$,'A1');
C#1541=PACKAGED_COMPONENT_TERMINATION(#1540,#1512);
C#1542=PACKAGED_COMPONENT_TERMINATION(#1540,#1521);
C#1543=PACKAGED_COMPONENT_TERMINATION(#1540,#1524);
C#1544=PACKAGED_COMPONENT_TERMINATION(#1540,#1527);
C#1545=PACKAGED_COMPONENT_TERMINATION(#1540,#1530);
C#1546=PACKAGED_COMPONENT_TERMINATION(#1540,#1533);
C#1547=PACKAGED_COMPONENT_TERMINATION(#1540,#1536);
C#1548=BOARD_OUTLINE(.F.,#1132,#1142,#1549,#1550);
C#1549=EE_TOLERANCE($,$);
C#1550=PCB_CURVE_LOOP(T.,#1549,(#1551,#1555,#1558,#1561));
C#1551=LINE(#1552,#1086);
C#1552=CARTESIAN_POINT((#1553,#1553,#1554));
C#1553=EE_MEASURE(-0.1,'inches');
C#1554=EE_MEASURE(0,'inches');
C#1555=LINE(#1556,#1115);
C#1556=CARTESIAN_POINT((#1557,#1553,#1554));
C#1557=EE_MEASURE(0.8,'inches');
C#1558=LINE(#1559,#1092);
C#1559=CARTESIAN_POINT((#1557,#1560,#1554));
C#1560=EE_MEASURE(0.5,'inches');
C#1561=LINE(#1562,#1097);
C#1562=CARTESIAN_POINT((#1553,#1560,#1554));
C#1563=DESIGN_LAYER_STRATUM((#1564),'base','fiber glass',#1565,#1566,'conduction layer separator');
C#1564=PCB_CURVE_LOOP(T.,#1134,(#1137));
C#1565=EE_TOLERANCE($,$);
C#1566=EE_MEASURE(0.15,'inches');
C#1567=PCB($,$,$,$,$,$,'AP210ADD01',(#1131,#1150,#1153,#1156,#1159,#1162,#1165,#1168,#1171,#1174,#1177,#1180,#1183,#1186,#1189,#1192,#1195,#1198,#1201,#1204,#1207,#1210,#1213,#1216,#1219,#1222,#1225,#1228,#1231,#1234,#1237,#1548),(#1563,#1132,#1142));
C#1568=PHYSICAL_NET(#1502,(#1569,#1573),'net 1');
C#1569=LAYER_CONNECTION_POINT((#1570,#1571),#1132);
C#1570=EE_MEASURE(0.05,'inches');
C#1571=EE_MEASURE(0.275,'inches');
C#1573=LAYER_CONNECTION_POINT((#1574,#1571),#1132);
C#1574=EE_MEASURE(0.65,'inches');
C#1575=PHYSICAL_NET(#1503,(#1576,#1578),'net 2');
C#1576=LAYER_CONNECTION_POINT((#1574,#1577),#1132);
C#1577=EE_MEASURE(0.175,'inches');
C#1578=LAYER_CONNECTION_POINT((#1570,#1577),#1132);
C#1579=PHYSICAL_NET(#1504,(#1580,#1582),'net 3');

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C#1580=LAYER_CONNECTION_POINT((#1574,#1581),#1132);
C#1581=EE_MEASURE(0.075,'inches');
C#1582=LAYER_CONNECTION_POINT((#1570,#1581),#1132);
C#1583=PHYSICAL_NET(#1505,(#1584,#1586),'net 4');
C#1584=LAYER_CONNECTION_POINT((#1574,#1585),#1132);
C#1585=EE_MEASURE(-0.025,'inches');
C#1586=LAYER_CONNECTION_POINT((#1570,#1585),#1132);
C#1587=PHYSICAL_NET(#1506,(#1588,#1591,#1593),'net 5');
C#1588=LAYER_CONNECTION_POINT((#1589,#1590),#1132);
C#1589=EE_MEASURE(-0.05,'inches');
C#1590=EE_MEASURE(0.125,'inches');
C#1591=LAYER_CONNECTION_POINT((#1592,#1581),#1132);
C#1592=EE_MEASURE(0.25,'inches');
C#1593=LAYER_CONNECTION_POINT((#1594,#1590),#1132);
C#1594=EE_MEASURE(0.2,'inches');
C#1596=PHYSICAL_NET(#1508,(#1597,#1599,#1602,#1604,#1607,#1610,#1613),'net 7');
C#1597=LAYER_CONNECTION_POINT((#1598,#1585),#1132);
C#1598=EE_MEASURE(0.55,'inches');
C#1599=LAYER_CONNECTION_POINT((#1600,#1601),#1132);
C#1600=EE_MEASURE(0.35,'inches');
C#1601=EE_MEASURE(0.425,'inches');
C#1602=LAYER_CONNECTION_POINT((#1603,#1601),#1132);
C#1603=EE_MEASURE(0.85,'inches');
C#1604=LAYER_CONNECTION_POINT((#1605,#1590),#1132);
C#1605=EE_MEASURE(0.6,'inches');
C#1607=LAYER_CONNECTION_POINT((#1605,#1609),#1132);
C#1609=EE_MEASURE(0.375,'inches');
C#1610=LAYER_CONNECTION_POINT((#1605,#1612),#1132);
C#1612=EE_MEASURE(0.475,'inches');
C#1613=LAYER_CONNECTION_POINT((#1614,#1612),#1132);
C#1614=EE_MEASURE(0.8,'inches');
C#1616=PHYSICAL_NET(#1509,(#1617,#1618,#1619,#1622),'net 8');
C#1617=LAYER_CONNECTION_POINT((#1570,#1601),#1132);
C#1618=LAYER_CONNECTION_POINT((#1598,#1585),#1132);
C#1619=LAYER_CONNECTION_POINT((#1620,#1621),#1132);
C#1620=EE_MEASURE(0.39,'inches');
C#1621=EE_MEASURE(0.315,'inches');
C#1622=LAYER_CONNECTION_POINT((#1620,#1624),#1132);
C#1624=EE_MEASURE(0.135,'inches');
C#1625=PHYSICAL_NET(#1511,(#1626,#1627,#1628,#1629,#1630,#1632,#1634,#1637,#1640,#1643,#1646,#1649,#1652,#1655),'gnd');
C#1626=LAYER_CONNECTION_POINT((#1598,#1601),#1132);
C#1627=LAYER_CONNECTION_POINT((#1592,#1601),#1132);
C#1628=LAYER_CONNECTION_POINT((#1589,#1601),#1132);
C#1629=LAYER_CONNECTION_POINT((#1592,#1571),#1132);
C#1630=LAYER_CONNECTION_POINT((#1631,#1581),#1132);
C#1631=EE_MEASURE(0.15,'inches');
C#1632=LAYER_CONNECTION_POINT((#1631,#1585),#1132);
C#1634=LAYER_CONNECTION_POINT((#1605,#1636),#1132);
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C#1636=EE_MEASURE(-0.075,'inches');
C#1637=LAYER_CONNECTION_POINT((#1638,#1636),#1132);
C#1638=EE_MEASURE(0.5,'inches');
C#1640=LAYER_CONNECTION_POINT((#1641,#1642),#1132);
C#1641=EE_MEASURE(0.31,'inches');
C#1642=EE_MEASURE(0.115,'inches');
C#1643=LAYER_CONNECTION_POINT((#1641,#1645),#1132);
C#1645=EE_MEASURE(0.215,'inches');
C#1646=LAYER_CONNECTION_POINT((#1631,#1609),#1132);
C#1649=LAYER_CONNECTION_POINT((#1650,#1609),#1132);
C#1650=EE_MEASURE(0,'inches');
C#1652=LAYER_CONNECTION_POINT((#1650,#1612),#1132);
C#1655=LAYER_CONNECTION_POINT((#1656,#1612),#1132);
C#1656=EE_MEASURE(0.3,'inches');
C#1658=PHYSICAL_NET(#1508,(#1659,#1660,#1661,#1664),'net 7');
C#1659=LAYER_CONNECTION_POINT((#1592,#1577),#1142);
C#1660=LAYER_CONNECTION_POINT((#1600,#1601),#1142);
C#1661=LAYER_CONNECTION_POINT((#1641,#1592),#1142);
C#1664=LAYER_CONNECTION_POINT((#1641,#1620),#1142);
C#1667=PHYSICAL_NET(#1507,(#1668,#1669,#1670,#1672,#1673,#1674,#1691),'net 6');
C#1668=LAYER_CONNECTION_POINT((#1592,#1585),#1142);
C#1669=LAYER_CONNECTION_POINT((#1598,#1571),#1142);
C#1670=LAYER_CONNECTION_POINT((#1671,#1601),#1142);
C#1671=EE_MEASURE(0.75,'inches');
C#1672=LAYER_CONNECTION_POINT((#1631,#1571),#1142);
C#1673=LAYER_CONNECTION_POINT((#1631,#1577),#1142);
C#1674=LAYER_CONNECTION_POINT((#1598,#1676),#1142);
C#1676=EE_MEASURE(0.32,'inches');
C#1677=PHYSICAL_NET(#1510,(#1678,#1679,#1680,#1682,#1685,#1688),'net 9');
C#1678=LAYER_CONNECTION_POINT((#1598,#1577),#1142);
C#1679=LAYER_CONNECTION_POINT((#1603,#1585),#1142);
C#1680=LAYER_CONNECTION_POINT((#1671,#1585),#1142);
C#1682=LAYER_CONNECTION_POINT((#1605,#1590),#1142);
C#1685=LAYER_CONNECTION_POINT((#1686,#1590),#1142);
C#1686=EE_MEASURE(0.7,'inches');
C#1688=LAYER_CONNECTION_POINT((#1671,#1581),#1142);
C#1691=LAYER_CONNECTION_POINT((#1692,#1601),#1142);
C#1692=EE_MEASURE(0.65,'inches');
C#1693=AXIS_PLACEMENT(#1694,#1695);
C#1694=ORIENTATION((1,0));
C#1695=CARTESIAN_POINT((#1692,#1601));
C#1696=EE_MATERIAL($,'copper plating',$,$,$);
C#1697=AXIS_PLACEMENT(#1694,#1698);
C#1698=CARTESIAN_POINT((#1570,#1571));
C#1699=AXIS_PLACEMENT(#1694,#1700);
C#1700=CARTESIAN_POINT((#1570,#1577));
C#1701=AXIS_PLACEMENT(#1694,#1702);
C#1702=CARTESIAN_POINT((#1589,#1590));
C#1703=AXIS_PLACEMENT(#1694,#1704);

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C#1704=CARTESIAN_POINT((#1570,#1581));
C#1705=AXIS_PLACEMENT(#1694,#1706);
C#1706=CARTESIAN_POINT((#1570,#1585));
C#1707=AXIS_PLACEMENT(#1694,#1708);
C#1708=CARTESIAN_POINT((#1589,#1601));
C#1709=NET_W_O_JUMPER(#1568);
C#1710=NET_W_O_JUMPER(#1575);
C#1711=NET_W_O_JUMPER(#1579);
C#1712=NET_W_O_JUMPER(#1583);
C#1713=NET_W_O_JUMPER(#1587);
C#1714=NET_W_O_JUMPER(#1596);
C#1715=NET_W_O_JUMPER(#1616);
C#1716=NET_W_O_JUMPER(#1625);
C#1717=NET_W_O_JUMPER(#1658);
C#1718=NET_W_O_JUMPER(#1667);
C#1719=NET_W_O_JUMPER(#1677);
C#1720=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1205,#1722,#1696);
C#1721=EE_TOLERANCE($,$);
C#1722=INTER_LAYER_JOIN(#1660,#1599));
C#1723=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1208,$,#1696);
C#1724=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1211,$,#1696);
C#1725=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1214,$,#1696);
C#1726=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1169,$,#1696);
C#1727=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1172,$,#1696);
C#1728=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1175,$,#1696);
C#1729=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1178,$,#1696);
C#1730=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1181,$,#1696);
C#1731=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1184,$,#1696);
C#1732=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1187,$,#1696);
C#1733=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1190,$,#1696);
C#1734=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1193,$,#1696);
C#1735=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1196,$,#1696);
C#1736=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1202,$,#1696);
C#1737=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1205,$,#1696);
C#1738=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1133,$,#1696);
C#1739=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1151,$,#1696);
C#1740=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1154,$,#1696);
C#1741=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1157,$,#1696);
C#1742=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1160,$,#1696);
C#1743=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1163,$,#1696);
C#1744=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1166,$,#1696);
C#1745=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1217,$,#1696);
C#1746=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1220,$,#1696);
C#1747=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1223,$,#1696);
C#1748=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1226,$,#1696);
C#1749=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1229,$,#1696);
C#1750=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1232,$,#1696);
C#1751=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1235,$,#1696);
C#1752=PLATED_THROUGH_PASSAGE(T.,#1132,#1142,#1721,#1238,$,#1696);

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C#1753=CONDUCTOR(#1132,(#1754,#1758,#1761),'net 1',(#1763),.F.);  
C#1754=PCB_CURVE_LOOP(.T.,#1755,(#1756,#1757));  
C#1755=EE_TOLERANCE($,$);  
C#1756=CURVE0;  
C#1757=CURVE0;  
C#1758=PCB_CURVE_LOOP(.F.,#1755,(#1760));  
C#1760=CURVE0;  
C#1761=PCB_CURVE_LOOP(.F.,#1755,(#1762));  
C#1762=CURVE0;  
C#1763=INTRA_LAYER_JOIN((#1569,#1573));  
C#1764=CONDUCTOR(#1132,(#1765,#1768,#1770),'net 2',(#1772),.F.);  
C#1765=PCB_CURVE_LOOP(.T.,#1755,(#1766,#1767));  
C#1766=CURVE0;  
C#1767=CURVE0;  
C#1768=PCB_CURVE_LOOP(.T.,#1755,(#1769));  
C#1769=CURVE0;  
C#1770=PCB_CURVE_LOOP(.F.,#1755,(#1771));  
C#1771=CURVE0;  
C#1772=INTRA_LAYER_JOIN((#1576,#1578));  
C#1773=CONDUCTOR(#1132,(#1774,#1777,#1779),'net 3',(#1781),.F.);  
C#1774=PCB_CURVE_LOOP(.T.,#1755,(#1775,#1776));  
C#1775=CURVE0;  
C#1776=CURVE0;  
C#1777=PCB_CURVE_LOOP(.F.,#1755,(#1778));  
C#1778=CURVE0;  
C#1779=PCB_CURVE_LOOP(.F.,#1755,(#1780));  
C#1780=CURVE0;  
C#1781=INTRA_LAYER_JOIN((#1580,#1582));  
C#1782=CONDUCTOR(#1132,(#1783,#1786,#1788),'net 4',(#1790),.F.);  
C#1783=PCB_CURVE_LOOP(.T.,#1755,(#1784,#1785));  
C#1784=CURVE0;  
C#1785=CURVE0;  
C#1786=PCB_CURVE_LOOP(.F.,#1755,(#1787));  
C#1787=CURVE0;  
C#1788=PCB_CURVE_LOOP(.F.,#1755,(#1789));  
C#1789=CURVE0;  
C#1790=INTRA_LAYER_JOIN((#1584,#1586));  
C#1791=CONDUCTOR(#1132,(#1792,#1795,#1797),'net 5',(#1801),.F.);  
C#1792=PCB_CURVE_LOOP(.T.,#1755,(#1793,#1794));  
C#1793=CURVE0;  
C#1794=CURVE0;  
C#1795=PCB_CURVE_LOOP(.F.,#1755,(#1796));  
C#1796=CURVE0;  
C#1797=PCB_CURVE_LOOP(.F.,#1755,(#1798));  
C#1798=CURVE0;  
C#1801=INTRA_LAYER_JOIN((#1588,#1591,#1593));  
C#1802=CONDUCTOR(#1132,(#1803,#1806,#1808,#1810),'net 7',(#1812),.F.);  
C#1803=PCB_CURVE_LOOP(.T.,#1755,(#1804,#1805));  
C#1804=CURVE0;
```

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C#1805=CURVE();
C#1806=PCB_CURVE_LOOP(.F.,#1755,(#1807));
C#1807=CURVE();
C#1808=PCB_CURVE_LOOP(.F.,#1755,(#1809));
C#1809=CURVE();
C#1810=PCB_CURVE_LOOP(.F.,#1755,(#1811));
C#1811=CURVE();
C#1812=INTRA_LAYER_JOIN((#1597,#1599,#1602,#1604,#1607,#1610,#1613));
C#1813=CONDUCTOR(#1132,(#1814,#1817,#1819),'net 8',(#1821),.F.);
C#1814=PCB_CURVE_LOOP(.T.,#1755,(#1815,#1816));
C#1815=CURVE();
C#1816=CURVE();
C#1817=PCB_CURVE_LOOP(.F.,#1755,(#1818));
C#1818=CURVE();
C#1819=PCB_CURVE_LOOP(.F.,#1755,(#1820));
C#1820=CURVE();
C#1821=INTRA_LAYER_JOIN((#1617,#1618,#1619,#1622));
C#1822=CONDUCTOR(#1142,(#1823,#1826,#1828,#1830,#1832,#1834,#1836),'net
6',(#1838),.F.);
C#1823=PCB_CURVE_LOOP(.T.,#1755,(#1824,#1825));
C#1824=CURVE();
C#1825=CURVE();
C#1826=PCB_CURVE_LOOP(.F.,#1755,(#1827));
C#1827=CURVE();
C#1828=PCB_CURVE_LOOP(.F.,#1755,(#1829));
C#1829=CURVE();
C#1830=PCB_CURVE_LOOP(.F.,#1755,(#1831));
C#1831=CURVE();
C#1832=PCB_CURVE_LOOP(.F.,#1755,(#1833));
C#1833=CURVE();
C#1834=PCB_CURVE_LOOP(.F.,#1755,(#1835));
C#1835=CURVE();
C#1836=PCB_CURVE_LOOP(.F.,#1755,(#1837));
C#1837=CURVE();
C#1838=INTRA_LAYER_JOIN((#1668,#1669,#1670,#1672,#1673,#1674,#1691));
C#1839=CONDUCTOR(#1142,(#1840,#1843,#1845),'net 7',(#1847),.F.);
C#1840=PCB_CURVE_LOOP(.T.,#1755,(#1841,#1842));
C#1841=CURVE();
C#1842=CURVE();
C#1843=PCB_CURVE_LOOP(.F.,#1755,(#1844));
C#1844=CURVE();
C#1845=PCB_CURVE_LOOP(.F.,#1755,(#1846));
C#1846=CURVE();
C#1847=INTRA_LAYER_JOIN((#1659,#1660,#1661,#1664));
C#1848=CONDUCTOR(#1142,(#1849,#1852,#1854,#1856),'net 9',(#1858),.F.);
C#1849=PCB_CURVE_LOOP(.T.,#1755,(#1850,#1851));
C#1850=CURVE();
C#1851=CURVE();
C#1852=PCB_CURVE_LOOP(.F.,#1755,(#1853));
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C#1853=CURVE();
C#1854=PCB_CURVE_LOOP(F.,#1755,(#1855));
C#1855=CURVE();
C#1856=PCB_CURVE_LOOP(F.,#1755,(#1857));
C#1857=CURVE();
C#1858=INTRA_LAYER_JOIN((#1678,#1679,#1680,#1682,#1685,#1688));
C#1859=CONDUCTOR(#1132,(#1860,#1863,#1865,#1867,#1869,#1871,#1873),'gnd',(#1875),.F.);
C#1860=PCB_CURVE_LOOP(T.,#1755,(#1861,#1862));
C#1861=CURVE();
C#1862=CURVE();
C#1863=PCB_CURVE_LOOP(F.,#1755,(#1864));
C#1864=CURVE();
C#1865=PCB_CURVE_LOOP(F.,#1755,(#1866));
C#1866=CURVE();
C#1867=PCB_CURVE_LOOP(F.,#1755,(#1868));
C#1868=CURVE();
C#1869=PCB_CURVE_LOOP(F.,#1755,(#1870));
C#1870=CURVE();
C#1871=PCB_CURVE_LOOP(F.,#1755,(#1872));
C#1872=CURVE();
C#1873=PCB_CURVE_LOOP(F.,#1755,(#1874));
C#1874=CURVE();
C#1875=INTRA_LAYER_JOIN((#1626,#1627,#1628,#1629,#1630,#1632,#1634,#1637,#1640,#164
3,#1646,#1649,#1652,#1655));
C#1876=LAND(#1132,(#1877,#1880),'u1 2',#1219);
C#1877=PCB_CURVE_LOOP(T.,#1878,(#1879));
C#1878=EE_TOLERANCE($,$);
C#1879=CIRCLE(#1884,#1882);
C#1880=PCB_CURVE_LOOP(F.,#1878,(#1881));
C#1881=CIRCLE(#1884,#1883);
C#1882=EE_MEASURE(0.038,'inches');
C#1883=EE_MEASURE(0.028,'inches');
C#1884=AXIS_PLACEMENT(#1885,#1886);
C#1885=ORIENTATION((1,0));
C#1886=CARTESIAN_POINT((#1592,#1571));
C#1888=LAND(#1132,(#1889,#1893),'u1 4',#1225);
C#1889=PCB_CURVE_LOOP(T.,#1878,(#1890));
C#1890=CIRCLE(#1891,#1882);
C#1891=AXIS_PLACEMENT(#1885,#1892);
C#1892=CARTESIAN_POINT((#1592,#1585));
C#1893=PCB_CURVE_LOOP(F.,#1878,(#1894));
C#1894=CIRCLE(#1891,#1883);
C#1895=LAND(#1132,(#1896,#1900),'u1 7',#1234);
C#1896=PCB_CURVE_LOOP(T.,#1878,(#1897));
C#1897=CIRCLE(#1898,#1882);
C#1898=AXIS_PLACEMENT(#1885,#1899);
C#1899=CARTESIAN_POINT((#1598,#1577));
C#1900=PCB_CURVE_LOOP(F.,#1878,(#1901));
C#1901=CIRCLE(#1898,#1883);
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C#1902=LAND(#1132,(#1903,#1907),'u1 8',#1237);
C#1903=PCB_CURVE_LOOP(.T.,#1878,(#1904));
C#1904=CIRCLE(#1905,#1882);
C#1905=AXIS_PLACEMENT(#1885,#1906);
C#1906=CARTESIAN_POINT((#1598,#1571));
C#1907=PCB_CURVE_LOOP(.F.,#1878,(#1908));
C#1908=CIRCLE(#1905,#1883);
C#1909=LAND(#1132,(#1910,#1914),'e1',#1131);
C#1910=PCB_CURVE_LOOP(.T.,#1878,(#1911));
C#1911=CIRCLE(#1912,#1882);
C#1912=AXIS_PLACEMENT(#1885,#1913);
C#1913=CARTESIAN_POINT((#1692,#1601));
C#1914=PCB_CURVE_LOOP(.F.,#1878,(#1915));
C#1915=CIRCLE(#1912,#1883);
C#1916=LAND(#1132,(#1910,#1914),'r3 1',#1180);
C#1917=PCB_CURVE_LOOP(.T.,#1878,(#1918));
C#1918=CIRCLE(#1919,#1882);
C#1919=AXIS_PLACEMENT(#1885,#1920);
C#1920=CARTESIAN_POINT((#1631,#1571));
C#1921=PCB_CURVE_LOOP(.F.,#1878,(#1922));
C#1922=CIRCLE(#1919,#1883);
C#1923=LAND(#1132,(#1924,#1928),'r4 1',#1186);
C#1924=PCB_CURVE_LOOP(.T.,#1878,(#1925));
C#1925=CIRCLE(#1926,#1882);
C#1926=AXIS_PLACEMENT(#1885,#1927);
C#1927=CARTESIAN_POINT((#1631,#1577));
C#1928=PCB_CURVE_LOOP(.F.,#1878,(#1929));
C#1929=CIRCLE(#1926,#1883);
C#1930=LAND(#1132,(#1931,#1935),'r1 1',#1168);
C#1931=PCB_CURVE_LOOP(.T.,#1878,(#1932));
C#1932=CIRCLE(#1933,#1882);
C#1933=AXIS_PLACEMENT(#1885,#1934);
C#1934=CARTESIAN_POINT((#1671,#1601));
C#1935=PCB_CURVE_LOOP(.F.,#1878,(#1936));
C#1936=CIRCLE(#1933,#1883);
C#1937=LAND(#1132,(#1938,#1942),'r1 2',#1171);
C#1938=PCB_CURVE_LOOP(.T.,#1878,(#1939));
C#1939=CIRCLE(#1940,#1882);
C#1940=AXIS_PLACEMENT(#1885,#1941);
C#1941=CARTESIAN_POINT((#1671,#1585));
C#1942=PCB_CURVE_LOOP(.F.,#1878,(#1943));
C#1943=CIRCLE(#1940,#1883);
C#1944=LAND(#1132,(#1945,#1949),'r2 1',#1174);
C#1945=PCB_CURVE_LOOP(.T.,#1878,(#1946));
C#1946=CIRCLE(#1947,#1882);
C#1947=AXIS_PLACEMENT(#1885,#1948);
C#1948=CARTESIAN_POINT((#1603,#1585));
C#1949=PCB_CURVE_LOOP(.F.,#1878,(#1950));
C#1950=CIRCLE(#1947,#1883);
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C#1951=LAND(#1142,(#1952,#1956),'e7',#1165);
C#1952=PCB_CURVE_LOOP(.T.,#1878,(#1953));
C#1953=CIRCLE(#1954,#1882);
C#1954=AXIS_PLACEMENT(#1885,#1955);
C#1955=CARTESIAN_POINT((#1589,#1601));
C#1956=PCB_CURVE_LOOP(.F.,#1878,(#1957));
C#1957=CIRCLE(#1954,#1883);
C#1958=LAND(#1142,(#1959,#1963),'e4',#1156);
C#1959=PCB_CURVE_LOOP(.T.,#1878,(#1960));
C#1960=CIRCLE(#1961,#1882);
C#1961=AXIS_PLACEMENT(#1885,#1962);
C#1962=CARTESIAN_POINT((#1589,#1590));
C#1963=PCB_CURVE_LOOP(.F.,#1878,(#1964));
C#1964=CIRCLE(#1961,#1883);
C#1965=LAND(#1142,(#1966,#1970),'e2',#1150);
C#1966=PCB_CURVE_LOOP(.T.,#1878,(#1967));
C#1967=CIRCLE(#1968,#1882);
C#1968=AXIS_PLACEMENT(#1885,#1969);
C#1969=CARTESIAN_POINT((#1570,#1571));
C#1970=PCB_CURVE_LOOP(.F.,#1878,(#1971));
C#1971=CIRCLE(#1968,#1883);
C#1972=LAND(#1142,(S,#1977),'e3',#1153);
C#1973=PCB_CURVE_LOOP(.T.,#1878,(#1974));
C#1974=CIRCLE(#1975,#1882);
C#1975=AXIS_PLACEMENT(#1885,#1976);
C#1976=CARTESIAN_POINT((#1570,#1577));
C#1977=PCB_CURVE_LOOP(.F.,#1878,(#1978));
C#1978=CIRCLE(#1975,#1883);
C#1979=LAND(#1142,(#1980,#1984),'e5',#1159);
C#1980=PCB_CURVE_LOOP(.T.,#1878,(#1981));
C#1981=CIRCLE(#1982,#1882);
C#1982=AXIS_PLACEMENT(#1885,#1983);
C#1983=CARTESIAN_POINT((#1570,#1581));
C#1984=PCB_CURVE_LOOP(.F.,#1878,(#1985));
C#1985=CIRCLE(#1982,#1883);
C#1986=LAND(#1142,(#1987,#1991),'e6',#1162);
C#1987=PCB_CURVE_LOOP(.T.,#1878,(#1988));
C#1988=CIRCLE(#1989,#1882);
C#1989=AXIS_PLACEMENT(#1885,#1990);
C#1990=CARTESIAN_POINT((#1570,#1585));
C#1991=PCB_CURVE_LOOP(.F.,#1878,(#1992));
C#1992=CIRCLE(#1989,#1883);
C#1993=LAND(#1142,(#1994,#1998),'c2 1',#1210);
C#1994=PCB_CURVE_LOOP(.T.,#1878,(#1995));
C#1995=CIRCLE(#1996,#1882);
C#1996=AXIS_PLACEMENT(#1885,#1997);
C#1997=CARTESIAN_POINT((#1570,#1601));
C#1998=PCB_CURVE_LOOP(.F.,#1878,(#1999));
C#1999=CIRCLE(#1996,#1883);
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C#2000=LAND(#1142,(#2001,#2005),'c2 2',#1213);
C#2001=PCB_CURVE_LOOP(.T.,#1878,(#2002));
C#2002=CIRCLE(#2003,#1882);
C#2003=AXIS_PLACEMENT(#1885,#2004);
C#2004=CARTESIAN_POINT((#1592,#1601));
C#2005=PCB_CURVE_LOOP(.F.,#1878,(#2006));
C#2006=CIRCLE(#2003,#1883);
C#2007=LAND(#1142,(#2008,#2012),'c1 2',#1207);
C#2008=PCB_CURVE_LOOP(.T.,#1878,(#2009));
C#2009=CIRCLE(#2010,#1882);
C#2010=AXIS_PLACEMENT(#1885,#2011);
C#2011=CARTESIAN_POINT((#1598,#1601));
C#2012=PCB_CURVE_LOOP(.F.,#1878,(#2013));
C#2013=CIRCLE(#2010,#1883);
C#2014=LAND(#1142,(#2015,#2019),'u1 3',#1222);
C#2015=PCB_CURVE_LOOP(.T.,#1878,(#2016));
C#2016=CIRCLE(#2017,#1882);
C#2017=AXIS_PLACEMENT(#1885,#2018);
C#2018=CARTESIAN_POINT((#1592,#1581));
C#2019=PCB_CURVE_LOOP(.F.,#1878,(#2020));
C#2020=CIRCLE(#2017,#1883);
C#2021=LAND(#1142,(#2022,#2026),'u1 5',#1228);
C#2022=PCB_CURVE_LOOP(.T.,#1878,(#2023));
C#2023=CIRCLE(#2024,#1882);
C#2024=AXIS_PLACEMENT(#1885,#2025);
C#2025=CARTESIAN_POINT((#1598,#1585));
C#2026=PCB_CURVE_LOOP(.F.,#1878,(#2027));
C#2027=CIRCLE(#2024,#1883);
C#2028=LAND(#1142,(#2029,#2033),'u1 6',#1231);
C#2029=PCB_CURVE_LOOP(.T.,#1878,(#2030));
C#2030=CIRCLE(#2031,#1882);
C#2031=AXIS_PLACEMENT(#1885,#2032);
C#2032=CARTESIAN_POINT((#1598,#1581));
C#2033=PCB_CURVE_LOOP(.F.,#1878,(#2034));
C#2034=CIRCLE(#2031,#1883);
C#2035=LAND(#1142,(#2036,#2053),'u1 1',#1216);
C#2036=PCB_CURVE_LOOP(.T.,#1878,(#2037,#2042,#2046,#2050));
C#2037=LINE(#2038,#2041);
C#2038=CARTESIAN_POINT((#2039,#2040));
C#2039=EE_MEASURE(0.21,'inches');
C#2040=EE_MEASURE(0.24,'inches');
C#2041=ORIENTATION((1,0));
C#2042=LINE(#2043,#2045);
C#2043=CARTESIAN_POINT((#2044,#2040));
C#2044=EE_MEASURE(0.29,'inches');
C#2045=ORIENTATION((0,1));
C#2046=LINE(#2047,#2049);
C#2047=CARTESIAN_POINT((#2044,#2048));
C#2048=EE_MEASURE(0.31,'inches');
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C#2049=ORIENTATION((-1,0));
C#2050=LINE(#2051,#2052);
C#2051=CARTESIAN_POINT((#2039,#2048));
C#2052=ORIENTATION((0,-1));
C#2053=PCB_CURVE_LOOP(F.,#1878,(#2054));
C#2054=CIRCLE(#2055,#1883);
C#2055=AXIS_PLACEMENT(#1885,#2056);
C#2056=CARTESIAN_POINT((#1592,#1571));
C#2057=LAND(#1142,(#2058,#2062),'r2 2',#1204);
C#2058=PCB_CURVE_LOOP(T.,#1878,(#2059));
C#2059=CIRCLE(#2060,#1882);
C#2060=AXIS_PLACEMENT(#1885,#2061);
C#2061=CARTESIAN_POINT((#1603,#1601));
C#2062=PCB_CURVE_LOOP(F.,#1878,(#2063));
C#2063=CIRCLE(#2060,#1883);
C#2064=LAND(#1142,(#2065,#2069),'r5 1',#1192);
C#2065=PCB_CURVE_LOOP(T.,#1878,(#2066));
C#2066=CIRCLE(#2067,#1882);
C#2067=AXIS_PLACEMENT(#1885,#2068);
C#2068=CARTESIAN_POINT((#1631,#1581));
C#2069=PCB_CURVE_LOOP(F.,#1878,(#2070));
C#2070=CIRCLE(#2067,#1883);
C#2071=LAND(#1142,(#2072,#2076),'r6 1',#1201);
C#2072=PCB_CURVE_LOOP(T.,#1878,(#2073));
C#2073=CIRCLE(#2074,#1882);
C#2074=AXIS_PLACEMENT(#1885,#2075);
C#2075=CARTESIAN_POINT((#1631,#1585));
C#2076=PCB_CURVE_LOOP(F.,#1878,(#2077));
C#2077=CIRCLE(#2074,#1883);
C#2078=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1753,#1069);
C#2079=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1753,#1540);
C#2080=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1764,#1070);
C#2081=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1764,#1540);
C#2082=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1773,#1071);
C#2083=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1773,#1540);
C#2084=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1782,#1072);
C#2085=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1782,#1540);
C#2086=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1791,#1075);
C#2087=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1791,#1540);
C#2088=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1802,#1075);
C#2089=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1802,#1073);
C#2090=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1802,#1068);
C#2091=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1813,#1074);
C#2092=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1813,#1075);
C#2093=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1822,#1540);
C#2094=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1822,#1075);
C#2095=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1822,#1075);
C#2096=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1822,#1067);
C#2097=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1822,#1069);
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C#2098=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1822,#1070);
C#2099=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1839,#1075);
C#2100=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1839,#1073);
C#2101=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1848,#1075);
C#2102=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1848,#1068);
C#2103=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1848,#1067);
C#2104=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1859,#1073);
C#2105=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1859,#1074);
C#2106=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1859,#1540);
C#2107=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1859,#1075);
C#2108=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1859,#1071);
C#2109=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1859,#1072);
C#2110=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1876,#1075);
C#2111=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1888,#1075);
C#2112=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1895,#1075);
C#2113=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1902,#1075);
C#2114=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1909,#1540);
C#2115=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1916,#1069);
C#2116=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1923,#1070);
C#2117=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1930,#1067);
C#2118=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1937,#1067);
C#2119=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1944,#1068);
C#2120=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1951,#1540);
C#2121=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1958,#1540);
C#2122=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1965,#1540);
C#2123=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1972,#1540);
C#2124=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1979,#1540);
C#2125=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1986,#1540);
C#2126=STRATUM FEATURE COMPONENT_RELATIONSHIP(#1993,#1074);
C#2127=STRATUM FEATURE COMPONENT_RELATIONSHIP(#2000,#1074);
C#2128=STRATUM FEATURE COMPONENT_RELATIONSHIP(#2007,#1073);
C#2129=STRATUM FEATURE COMPONENT_RELATIONSHIP(#2014,#1075);
C#2130=STRATUM FEATURE COMPONENT_RELATIONSHIP(#2021,#1075);
C#2131=STRATUM FEATURE COMPONENT_RELATIONSHIP(#2028,#1075);
C#2132=STRATUM FEATURE COMPONENT_RELATIONSHIP(#2035,#1075);
C#2133=STRATUM FEATURE COMPONENT_RELATIONSHIP(#2057,#1068);
C#2134=STRATUM FEATURE COMPONENT_RELATIONSHIP(#2064,#1071);
C#2135=STRATUM FEATURE COMPONENT_RELATIONSHIP(#2071,#1072);
C#2136=LAYER(#1132,#1563,'ONE');
C#2137=LAYER(#1142,#1563,'TWO');
C#2138=DECOMPOSABLE_REQUIREMENT($,#24,$,$,$,$,$,$,#28);
C#2139=REQUIREMENT_COMPOSITION(#2140,#2138);
C#2140=REQUIREMENT_OCCURRENCE(#2141);
C#2141=DESIGN_REQUIREMENT($,#34,$,$,$,$,$,$,#37);
C#2142=REQUIREMENT_COMPOSITION(#2143,#2138);
C#2143=REQUIREMENT_OCCURRENCE(#2144);
C#2144=DESIGN_REQUIREMENT($,#38,$,$,$,$,$,$,#41);
C#2147=DECOMPOSABLE_REQUIREMENT($,#10,$,$,$,$,$,$,$,#14);
C#2149=REQUIREMENT_COMPOSITION(#2150,#2147);

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:::::::::::  
func.one  
:::::::
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STEP_WORKING_SESSION;  
HEADER;  
FILE_DESCRIPTION(("Test Case 3a"),' ');  
FILE_NAME('func.one','1994-03-22 08:40:55','(James J. Kachmarsky)', '(Tobyhanna Army Depot)',  
  'dp_sum_86.01',' ');  
FILE_SCHEMA(("Func UoF"));  
ENDSEC;  
DATA;  
C#1=FUNCTIONAL_UNIT('U1',#2,(#4,#9));  
C#2=FUNCTIONAL_UNIT_DEFINITION_W_ANALYTIC REP('NAND 2',(#4,#9),(#10));  
C#3=LIBRARY_FUNCTION('NAND 2','A','CADAT');  
C#4=NUMERIC_PARAMETER(#5,'Rise Time',#6);  
C#5=EE_MEASURE(10,'nanosecond');  
C#6=EE_TOLERANCE(#7,#8);  
C#7=EE_MEASURE(8,'nanosecond');  
C#8=EE_MEASURE(12,'nanosecond');  
C#9=NUMERIC_PARAMETER(#5,'Fall Time',#6);  
C#10=LIBRARY_MODEL($,$,(#11),$,#12,$,'00',#13,#14,(#18));  
C#11=EE_TEXT(("Digital Model of a 2 input NAND gate"));  
C#12=DATE();  
C#13=ORGANIZATION('Racal Redac','?');  
C#14=LANGUAGE_REFERENCE_MANUAL($,$,(#15),$,#12,$,'CADAT',#13,$,#13);  
C#15=EE_TEXT(("General Purpose Digital Simulator"));  
C#16=CHARACTERISTIC('Rise Time',#6,#5);  
C#17=CHARACTERISTIC('Fall time',#6,#5);  
C#18=COORDINATED_CHARACTERISTIC((#16,#17),'Output Pulse Shape');  
C#19=FUNCTIONAL_UNIT_PORT(#20,#1);  
C#20=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#2,'IN 1');  
C#21=FUNCTIONAL_UNIT_PORT(#22,#1);  
C#22=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#2,'IN 2');  
C#23=FUNCTIONAL_UNIT_PORT(#24,#1);  
C#24=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#2,'OUT');  
C#25=FUNCTIONAL_UNIT('U2',#2,(#4,#9));  
C#27=FUNCTIONAL_UNIT_PORT(#20,#25);  
C#28=FUNCTIONAL_UNIT_PORT(#22,#25);  
C#29=FUNCTIONAL_UNIT_PORT(#24,#25);  
C#30=FUNCTIONAL_UNIT('U3',#2,(#4,#9));  
C#31=FUNCTIONAL_UNIT_PORT(#20,#30);  
C#32=FUNCTIONAL_UNIT_PORT(#22,#30);  
C#33=FUNCTIONAL_UNIT_PORT(#24,#30);  
C#34=FUNCTIONAL_UNIT('U4',#2,(#4,#9));  
C#35=FUNCTIONAL_UNIT_PORT(#20,#34);  
C#36=FUNCTIONAL_UNIT_PORT(#22,#34);  
C#37=FUNCTIONAL_UNIT_PORT(#24,#34);  
C#38=FUNCTIONAL_UNIT('U5',#2,(#4,#9));
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C#39=FUNCTIONAL_UNIT_PORT(#20,#38);
C#40=FUNCTIONAL_UNIT_PORT(#22,#38);
C#41=FUNCTIONAL_UNIT_PORT(#24,#38);
C#42=FUNCTIONAL_UNIT('U6',#2,(#4,#9));
C#43=FUNCTIONAL_UNIT_PORT(#20,#42);
C#44=FUNCTIONAL_UNIT_PORT(#22,#42);
C#45=FUNCTIONAL_UNIT_PORT(#24,#42);
C#46=FUNCTIONAL_UNIT('U7',#2,(#4,#9));
C#47=FUNCTIONAL_UNIT_PORT(#20,#46);
C#48=FUNCTIONAL_UNIT_PORT(#22,#46);
C#49=FUNCTIONAL_UNIT_PORT(#24,#46);
C#50=FUNCTIONAL_UNIT('U8',#2,(#4,#9));
C#51=FUNCTIONAL_UNIT_PORT(#20,#50);
C#52=FUNCTIONAL_UNIT_PORT(#22,#50);
C#53=FUNCTIONAL_UNIT_PORT(#24,#50);
C#54=FUNCTIONAL_UNIT('U9',#55,(#4,#9));
C#55=FUNCTIONAL_UNIT_DEFINITION_W_ANALYTIC REP('XOR 2',(#4,#9),(#57));
C#56=LIBRARY_FUNCTION('XOR 2','A','CADAT');
C#57=LIBRARY_MODEL($,$,($58),$,#12,$,'86',$#13,$#14,($18));
C#58=EE_TEXT('Digital Model of a 2 input XOR gate');
C#60=FUNCTIONAL_UNIT_PORT(#61,#54);
C#61=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#55,'IN 1');
C#62=FUNCTIONAL_UNIT_PORT(#63,#54);
C#63=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#55,'IN 2');
C#64=FUNCTIONAL_UNIT_PORT(#65,#54);
C#65=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#55,'OUT');
C#66=FUNCTIONAL_UNIT('U10',#67,(#4,#9));
C#67=FUNCTIONAL_UNIT_DEFINITION_W_ANALYTIC REP('NAND 4',(#4,#9),($69));
C#68=LIBRARY_FUNCTION('NAND 4','A','CADAT');
C#69=LIBRARY_MODEL($,$,($70),$,#12,$,'20',$#13,$#14,($18));
C#70=EE_TEXT('Digital Model of a 4 input NAND gate');
C#71=FUNCTIONAL_UNIT_PORT(#72,#66);
C#72=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#67,'IN 1');
C#73=FUNCTIONAL_UNIT_PORT(#74,#66);
C#74=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#67,'IN 2');
C#75=FUNCTIONAL_UNIT_PORT(#76,#66);
C#76=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#67,'IN 3');
C#77=FUNCTIONAL_UNIT_PORT(#78,#66);
C#78=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#67,'IN 4');
C#79=FUNCTIONAL_UNIT_PORT(#80,#66);
C#80=EXTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#67,'OUT');
C#81=FUNCTIONAL_UNIT('U11',#67,(#4,#9));
C#82=FUNCTIONAL_UNIT_PORT(#72,#81);
C#83=FUNCTIONAL_UNIT_PORT(#74,#81);
C#84=FUNCTIONAL_UNIT_PORT(#76,#81);
C#85=FUNCTIONAL_UNIT_PORT(#78,#81);
C#86=FUNCTIONAL_UNIT_PORT(#80,#81);
C#87=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#88,(#23,#71));
C#88=NET_ELEMENT('net_1');

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C#89=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#90,(#29,#73));
C#90=NET_ELEMENT('net_2');
C#91=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#92,(#33,#75));
C#92=NET_ELEMENT('net_3');
C#93=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#94,(#37,#77));
C#94=NET_ELEMENT('net_4');
C#95=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#96,(#41,#82));
C#96=NET_ELEMENT('net_5');
C#97=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#98,(#45,#83));
C#98=NET_ELEMENT('net_6');
C#99=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#100,(#49,#84));
C#100=NET_ELEMENT('net_7');
C#101=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#102,(#53,#85));
C#102=NET_ELEMENT('net_8');
C#103=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#104,(#79,#60));
C#104=NET_ELEMENT('net_9');
C#105=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#106,(#86,#62));
C#106=NET_ELEMENT('net_10');
C#107=FUNCTIONAL_UNIT('U1',#108,(#4,#9));
C#108=DECOMPOSABLE_FUNCTIONAL_UNIT_DEFINITION('select',(#4,#9),(#109));
C#109=DESIGN_SPECIFIC_MODEL($,$,(#110),$,#111,$,'CS-111',#112,#14,(#18));
C#110=EE_TEXT('Special design selector gate');
C#111=DATE();
C#112=ORGANIZATION('Tobyhanna Army Depot','11 Midway Road, ATTN: SDSTO-ME-F,
Tobyhanna, PA, 18466-5075');
C#113=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#1);
C#114=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#25);
C#115=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#30);
C#116=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#34);
C#117=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#38);
C#118=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#42);
C#119=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#46);
C#120=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#50);
C#121=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#54);
C#122=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#66);
C#123=FUNCTIONAL_COMPOSITION_RELATIONSHIP(#108,#81);
C#124=STRUCTURAL_CONFIGURATION((#1,#25,#30,#34,#38,#42,#46,#50,#54,#66,#81),#107,'C
S-111');
C#125=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INA1',#20);
C#126=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INA2',#22);
C#127=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INA3',#20);
C#128=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INA4',#22);
C#129=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INA5',#20);
C#130=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INA6',#22);
C#131=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INA7',#20);
C#132=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INA8',#22);
C#133=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INB1',#20);
C#134=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INB2',#22);
C#135=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INB3',#20);

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C#136=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INB4',#22);
C#137=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INB5',#20);
C#138=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INB6',#22);
C#139=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INB7',#20);
C#140=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'INB8',#22);
C#141=INTERNAL_ACCESS_FUNCTIONAL_UNIT_PORT_DEFINITION(#108,'OUT',#65);
C#142=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#143,(#125,#19));
C#143=NET_ELEMENT('net_11');
C#144=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#145,(#126,#21));
C#145=NET_ELEMENT('net_12');
C#146=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#147,(#127,#27));
C#147=NET_ELEMENT('net_13');
C#148=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#149,(#128,#28));
C#149=NET_ELEMENT('net_14');
C#150=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#151,(#129,#31));
C#151=NET_ELEMENT('net_15');
C#152=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#153,(#130,#32));
C#153=NET_ELEMENT('net_16');
C#154=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#155,(#131,#35));
C#155=NET_ELEMENT('net_17');
C#156=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#157,(#132,#36));
C#157=NET_ELEMENT('net_18');
C#158=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#159,(#133,#39));
C#159=NET_ELEMENT('net_19');
C#160=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#161,(#134,#40));
C#161=NET_ELEMENT('net_20');
C#162=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#163,(#135,#43));
C#163=NET_ELEMENT('net_21');
C#164=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#165,(#136,#44));
C#165=NET_ELEMENT('net_22');
C#166=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#167,(#137,#47));
C#167=NET_ELEMENT('net_23');
C#168=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#169,(#138,#48));
C#169=NET_ELEMENT('net_24');
C#170=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#171,(#139,#51));
C#171=NET_ELEMENT('net_25');
C#172=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#173,(#140,#52));
C#173=NET_ELEMENT('net_26');
C#174=FUNCTIONAL_CONNECTIVITY_DEFINITION(#108,#175,(#140,#52));
C#175=NET_ELEMENT('net_27');
ENDSEC;
END-STEP_WORKING_SESSION;
```

:::::::::::
geom.one
:::::::

STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION(('Test Case 4a'), ' ');
FILE_NAME('geom.one','1994-03-23 15:28:08','(James J. Kachmarsky),(Tobyhanna Army Depot)',
'dp_sum_86.01',' ');
FILE_SCHEMA(('Geom UoF','Pcb UoF','Pca UoF','Part UoF'));
ENDSEC;
DATA;
C#1=CONDUCTOR(#2,(#41,#43,#47),'Power Plane',(#55),.F.);
C#2=DESIGN_LAYER_STRATUM((#3),'Power Plane','copper',#20,#23,'conduction');
C#3=PCB_CURVE_LOOP(T.,#4,(#5,#6,#7,#8));
C#4=EE_TOLERANCE(\$,\$);
C#5=LINE(#9,#11);
C#6=LINE(#12,#14);
C#7=LINE(#15,#17);
C#8=LINE(#18,#19);
C#9=CARTESIAN_POINT((#10,#10,#10));
C#10=EE_MEASURE(0,'inches');
C#11=ORIENTATION((1,0,0));
C#12=CARTESIAN_POINT((#13,#10,#10));
C#13=EE_MEASURE(2,'inches');
C#14=ORIENTATION((0,1,0));
C#15=CARTESIAN_POINT((#13,#16,#10));
C#16=EE_MEASURE(4,'inches');
C#17=ORIENTATION((-1,0,0));
C#18=CARTESIAN_POINT((#10,#13,#10));
C#19=ORIENTATION((0,-1,0));
C#20=EE_TOLERANCE(#21,#22);
C#21=EE_MEASURE(0.009,'inches');
C#22=EE_MEASURE(0.011,'inches');
C#23=EE_MEASURE(0.01,'inches');
C#24=TRIMMED_CURVE(.CARTESIAN.,.F.,(#25),(#26),#27);
C#25=CARTESIAN_POINT((#34,#32,#10));
C#26=CARTESIAN_POINT((#33,#32,#10));
C#27=CIRCLE(#29,#28);
C#28=EE_MEASURE(0.0225,'inches');
C#29=AXIS_PLACEMENT(#11,#30);
C#30=CARTESIAN_POINT((#31,#32,#10));
C#31=EE_MEASURE(1.25,'inches');
C#32=EE_MEASURE(1.275,'inches');
C#33=EE_MEASURE(1.2275,'inches');
C#34=EE_MEASURE(1.2725,'inches');
C#35=LINE(#25,#19);
C#36=LINE(#26,#19);
C#37=TRIMMED_CURVE(.CARTESIAN.,.F.,(#38),(#39),#52);

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C#38=CARTESIAN_POINT(#34,#40,#10);
C#39=CARTESIAN_POINT(#33,#40,#10);
C#40=EE_MEASURE(0.275,'inches');
C#41=PCB_CURVE_LOOP(.T.,#42,(#24,#35,#36,#37));
C#42=EE_TOLERANCE($,$);
C#43=PCB_CURVE_LOOP(.F.,#44,(#45));
C#44=EE_TOLERANCE($,$);
C#45=CIRCLE(#29,#46);
C#46=EE_MEASURE(0.014,'inches');
C#47=PCB_CURVE_LOOP(.F.,#44,(#48));
C#48=CIRCLE(#49,#46);
C#49=AXIS_PLACEMENT(#11,#50);
C#50=CARTESIAN_POINT(#31,#40,#10));
C#52=CIRCLE(#53,#28);
C#53=AXIS_PLACEMENT(#11,#54);
C#54=CARTESIAN_POINT(#31,#40,#10));
C#55=INTRA_LAYER_JOIN((#56,#57));
C#56=LAYER_CONNECTION_POINT(#31,#32,#10),#2);
C#57=LAYER_CONNECTION_POINT(#31,#40,#10),#2);
ENDSEC;
END-STEP_WORKING_SESSION;
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:::::::::::
geom.two
::::::::::

STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION(("Test Case 4b",' ');
FILE_NAME('geom.two','1994-03-23 12:00:44','(James J. Kachmarsky'),('Tobyhanna Army Depot'),
,'dp_sum_86.01',' ');
FILE_SCHEMA(('Geom UoF','Pcb UoF','Pca UoF','Part UoF'));
ENDSEC;
DATA;
C#1=SURFACE_MOUNT_LAND(#2,(#19,#31),'flat pack pad',$);
C#2=DESIGN_LAYER_STRATUM((#3),'Component side','copper',#17,#18,'conduction');
C#3=PCB_CURVE_LOOP(T.,#4,(#5,#6,#7,#8));
C#4=EE_TOLERANCE($,$);
C#5=LINE(#9,#11);
C#6=LINE(#12,#11);
C#7=LINE(#14,#11);
C#8=LINE(#16,#11);
C#9=CARTESIAN_POINT((#10,#10,#10));
C#10=EE_MEASURE(0,'inches');
C#11=ORIENTATION((1,0,0));
C#12=CARTESIAN_POINT((#10,#13,#10));
C#13=EE_MEASURE(2,'inches');
C#14=CARTESIAN_POINT((#15,#13,#10));
C#15=EE_MEASURE(4,'inches');
C#16=CARTESIAN_POINT((#15,#10,#10));
C#17=EE_TOLERANCE($,$);
C#18=EE_MEASURE(0.01,'inches');
C#19=PCB_CURVE_LOOP(T.,#20,(#21,#22,#23));
C#20=EE_TOLERANCE($,$);
C#21=LINE(#24,#11);
C#22=LINE(#26,#11);
C#23=LINE(#28,#30);
C#24=CARTESIAN_POINT((#25,#25,#10));
C#25=EE_MEASURE(0.125,'inches');
C#26=CARTESIAN_POINT((#27,#29,#10));
C#27=EE_MEASURE(0.225,'inches');
C#28=CARTESIAN_POINT((#25,#27,#10));
C#29=EE_MEASURE(0.14,'inches');
C#30=ORIENTATION((0,-1,0));
C#31=PCB_CURVE_LOOP(T.,#20,(#35));
C#35=TRIMMED_CURVE(.CARTESIAN.,.F.,(#26),(#28),#36);
C#36=CIRCLE(#37,#41);
C#37=AXIS_PLACEMENT(#11,#38);
C#38=CARTESIAN_POINT((#39,#40,#10));
C#39=EE_MEASURE(0.1325,'inches');
C#40=EE_MEASURE(0.2325,'inches');

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C#41=EE_MEASURE(0.0075,'inches');
C#42=PACKAGED_COMPONENT(#43,$,$,$,'U2');
C#43=PACKAGED_PART($,$,$,$,$,$,'SN74LS00FL',$);
C#44=STRATUM_FEATURE_COMPONENT_RELATIONSHIP(#1,#42);
ENDSEC;
END-STEP_WORKING_SESSION;
```

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part.four
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STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION(("Test Case 5d"),' ');
FILE_NAME('part.four','1994-04-11 13:28:54','(James J. Kachmarsky)', '(Tobyhanna Army Depot)', 'dp_sum_86.01','');
FILE_SCHEMA((Part UoF,'Pca UoF','Geom UoF','Util UoF'));
ENDSEC;
DATA;
C#1=PCA_COMPONENT(#16,$,$,$,'U1');
C#14=PACKAGED_COMPONENT_TERMINATION(#15,#20);
C#15=PACKAGED_COMPONENT(#16,$,$,$,'U1');
C#16=PACKAGED_PART($,#17,$,$,$,$,#18,'54LS00',#19);
C#17=TECHNOLOGY('Dual Inline Package','?','?');
C#18=EE_MATERIAL($,'ceramic',$,$,$);
C#19=EE_MATERIAL($,'oop',$,$,$);
C#20=PACKAGED_PART_TERMINATION(#21,#24,.T.,#16,'IN1 A');
C#21=PHYSICAL_DEVICE_PORT(#22,'ONE',$);
C#22=EE_DEVICE($,#23,$,$,$,$,'Silicon','Ion Implantation','LS00');
C#23=TECHNOLOGY('Transistor Transistor Logic','Ion Implantation','?');
I#24=PACKAGE_TERMINATION(#25,#29,$,#32);
I#25=TERMINAL($,#26,$,$,$,$,$,$,#27,#28);
C#26=TECHNOLOGY('lead','extrusion','?');
I#27=EE_TEXT($);
C#28=EE_MATERIAL($,'Copper Nickel Tin',$,$,$);
C#29=PACKAGE_BODY($,#30,$,$,$,$,$,#31);
C#30=TECHNOLOGY('?','?','?');
C#31=EE_MATERIAL($,'ceramic',$,$,$);
C#32=PACKAGE($,#17,$,$,$,$,'DIP 14');
C#33=PACKAGED_COMPONENT_TERMINATION(#15,#34);
C#34=PACKAGED_PART_TERMINATION(#35,#36,.F.,#16,'IN2 A');
C#35=PHYSICAL_DEVICE_PORT(#22,'TWO',$);
I#36=PACKAGE_TERMINATION(#25,#29,$,#32);
C#37=PACKAGED_COMPONENT_TERMINATION(#15,#38);
C#38=PACKAGED_PART_TERMINATION(#39,#40,.F.,#16,'OUT A');
C#39=PHYSICAL_DEVICE_PORT(#22,'THREE',$);
I#40=PACKAGE_TERMINATION(#25,#29,$,#32);
C#41=PACKAGED_COMPONENT_TERMINATION(#15,#42);
C#42=PACKAGED_PART_TERMINATION(#43,#44,.F.,#16,'IN1 B');
C#43=PHYSICAL_DEVICE_PORT(#22,'FOUR',$);
I#44=PACKAGE_TERMINATION(#25,#29,$,#32);
C#45=PACKAGED_COMPONENT_TERMINATION(#15,#46);
C#46=PACKAGED_PART_TERMINATION(#47,#48,.F.,#16,'IN2 B');
C#47=PHYSICAL_DEVICE_PORT(#22,'FIVE',$);
I#48=PACKAGE_TERMINATION(#25,#29,$,#32);
C#49=PACKAGED_COMPONENT_TERMINATION(#15,#50);
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C#50=PACKAGED_PART_TERMINATION(#51,#52,.F.,#16,'OUT B');
C#51=PHYSICAL_DEVICE_PORT(#22,'SIX',$);
I#52=PACKAGE_TERMINATION(#25,#29,$,#32);
C#54=PACKAGED_COMPONENT_TERMINATION(#15,#55);
C#55=PACKAGED_PART_TERMINATION(#56,#57,.F.,#16,'IN1 C');
C#56=PHYSICAL_DEVICE_PORT(#22,'EIGHT',$);
I#57=PACKAGE_TERMINATION(#25,#29,$,#32);
C#58=PACKAGED_COMPONENT_TERMINATION(#15,#59);
C#59=PACKAGED_PART_TERMINATION(#60,#61,.F.,#16,'IN2 C');
C#60=PHYSICAL_DEVICE_PORT(#22,'NINE',$);
I#61=PACKAGE_TERMINATION(#25,#29,$,#32);
C#62=PACKAGED_COMPONENT_TERMINATION(#15,#63);
C#63=PACKAGED_PART_TERMINATION(#64,#65,.F.,#16,'OUT C');
C#64=PHYSICAL_DEVICE_PORT(#22,'TEN',$);
I#65=PACKAGE_TERMINATION(#25,#29,$,#32);
C#66=PACKAGED_COMPONENT_TERMINATION(#15,#67);
C#67=PACKAGED_PART_TERMINATION(#68,#69,.F.,#16,'IN1 D');
C#68=PHYSICAL_DEVICE_PORT(#22,'ELEVEN',$);
I#69=PACKAGE_TERMINATION(#25,#29,$,#32);
C#70=PACKAGED_COMPONENT_TERMINATION(#15,#71);
C#71=PACKAGED_PART_TERMINATION(#72,#73,.F.,#16,'IN2 D');
C#72=PHYSICAL_DEVICE_PORT(#22,'TWELVE',$);
I#73=PACKAGE_TERMINATION(#25,#29,$,#32);
C#74=PACKAGED_COMPONENT_TERMINATION(#15,#75);
C#75=PACKAGED_PART_TERMINATION(#76,#77,.F.,#16,'OUT D');
C#76=PHYSICAL_DEVICE_PORT(#22,'THIRTEEN',$);
I#77=PACKAGE_TERMINATION(#25,#29,$,#32);
C#78=PACKAGED_PART($,$,$,$,$,$,$,'socket DIP 14',$);
C#79=PACKAGED_PART_TERMINATION(#80,#82,.T.,#78,'ONE');
C#80=PHYSICAL_DEVICE_PORT(#81,'ONE',$);
C#81=EE_DEVICE($,$,$,$,$,$,$,'interface');
I#82=PACKAGE_TERMINATION(#83,#85,$,$);
I#83=TERMINAL($,#26,$,$,$,$,$,$,#84,#28);
C#84=EE_TEXT('DIP lead socket'));
C#85=PACKAGE_BODY($,$,$,$,$,$,$,#86);
C#86=EE_MATERIAL($,'plastic',$,$,$);
C#87=PACKAGE($,$,$,$,$,$,'DIP 14 socket');
C#88=PACKAGED_PART_TERMINATION(#89,#90,.F.,#78,'TWO');
C#89=PHYSICAL_DEVICE_PORT(#81,'TWO',$);
I#90=PACKAGE_TERMINATION(#83,#85,$,#87);
C#91=PACKAGED_PART_TERMINATION(#92,#93,.F.,#78,'THREE');
C#92=PHYSICAL_DEVICE_PORT(#81,'THREE',$);
I#93=PACKAGE_TERMINATION(#83,#85,$,#87);
C#94=PACKAGED_PART_TERMINATION(#95,#96,.F.,#78,'FOUR');
C#95=PHYSICAL_DEVICE_PORT(#81,'FOUR',$);
I#96=PACKAGE_TERMINATION(#83,#85,$,#87);
C#97=PACKAGED_PART_TERMINATION(#98,#99,.F.,#78,'FIVE');
C#98=PHYSICAL_DEVICE_PORT(#81,'FIVE',$);
I#99=PACKAGE_TERMINATION(#83,#85,$,#87);
```

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C#100=PACKAGED_PART_TERMINATION(#101,#102,.F.,#78,'SIX');
C#101=PHYSICAL_DEVICE_PORT(#81,'SIX',$);
I#102=PACKAGE_TERMINATION(#83,#85,$,#87);
C#103=PACKAGED_PART_TERMINATION(#104,#105,.F.,#78,'SEVEN');
C#104=PHYSICAL_DEVICE_PORT(#81,'SEVEN',$);
I#105=PACKAGE_TERMINATION(#83,#85,$,#87);
C#106=PACKAGED_PART_TERMINATION(#107,#108,.F.,#78,'EIGHT');
C#107=PHYSICAL_DEVICE_PORT(#81,'EIGHT',$);
I#108=PACKAGE_TERMINATION(#83,#85,$,#87);
C#109=PACKAGED_PART_TERMINATION(#110,#111,.F.,#78,'NINE');
C#110=PHYSICAL_DEVICE_PORT(#81,'NINE',$);
I#111=PACKAGE_TERMINATION(#83,#85,$,#87);
C#112=PACKAGED_PART_TERMINATION(#113,#114,.F.,#78,'TEN');
C#113=PHYSICAL_DEVICE_PORT(#81,'TEN',$);
I#114=PACKAGE_TERMINATION(#83,#85,$,#87);
C#115=PACKAGED_PART_TERMINATION(#116,#117,.F.,#78,'ELEVEN');
C#116=PHYSICAL_DEVICE_PORT(#81,'ELEVEN',$);
I#117=PACKAGE_TERMINATION(#83,#85,$,#87);
C#118=PACKAGED_PART_TERMINATION(#119,#120,.F.,#78,'TWELVE');
C#119=PHYSICAL_DEVICE_PORT(#81,'TWELVE',$);
I#120=PACKAGE_TERMINATION(#83,#85,$,#87);
C#121=PACKAGED_PART_TERMINATION(#122,#123,.F.,#78,'THIRTEEN');
C#122=PHYSICAL_DEVICE_PORT(#81,'THIRTEEN',$);
I#123=PACKAGE_TERMINATION(#83,#85,$,#87);
C#124=PACKAGED_PART_TERMINATION(#125,#126,.F.,#78,'FOURTEEN');
C#125=PHYSICAL_DEVICE_PORT(#81,'FOURTEEN',$);
I#126=PACKAGE_TERMINATION(#83,#85,$,#87);
ENDSEC;
END-STEP_WORKING_SESSION;
```

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:::::::::::  
part.one  
:::::::
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```
STEP_WORKING_SESSION;  
HEADER;  
FILE_DESCRIPTION(("Test Case 5a"),' ');  
FILE_NAME('part.one','1994-03-22 09:06:29','(James J. Kachmarsky)',('Tobyhanna Army Depot'),'  
'dp_sum_86.01',' ');  
FILE_SCHEMA((Part UoF,'Util UoF','Rqmt UoF));  
ENDSEC;  
DATA;  
C#1=PCA_PART($,#2,$,$,$,$,#3,'ferrite');  
C#2=TECHNOLOGY('mold','pour molding','Ferric Oxide');  
C#3=EE_MATERIAL($,'Ferric Oxide with other trace elements',$,$,$);  
C#4=PCA_PART((#15),#5,(#26,#31),(#34),#6,'RLR07C1003KN');  
C#5=TECHNOLOGY('Passive Electronic Components','Film','?');  
C#6=EE_MATERIAL($,'resistive film',$,$,#7);  
C#7=MATERIAL_SPECIFICATION($,#8,(#11),(#12,#13),#12,#14,'MIL-R-39017E',#9,'?',#9);  
C#8=EE_APPROVAL('Standardize Film Resistors',#9,.T.,#10);  
C#9=ORGANIZATION('US Army Laboratory Command','ATTN: SLCET-R-S, Fort Monmouth, NJ,  
07703-5000');  
C#10=DATE();  
C#11=EE_TEXT('use of any material inorder to meet the design paramteres');  
C#12=DATE();  
C#13=DATE();  
C#14=ACCESS_CODE();  
C#15=ANALYTIC_MODEL($,$,(#16,#21),$,#17,#18,'rlr07',#19,#20,(#25));  
C#16=EE_TEXT('Fixed 1/4 watt resistor');  
C#17=DATE();  
C#18=ACCESS_CODE();  
C#19=ORGANIZATION('Tobyhanna Army Depot','11 Midway Road, ATTN: SDSTO-ME-F,  
Tobyhanna, PA, 18466-5075');  
C#20=LANGUAGE_REFERENCE_MANUAL($,$,(#21),$,#22,$,'SABER',#24,$,#24);  
C#21=EE_TEXT('SABER Version 2.2');  
C#22=DATE();  
C#23=ACCESS_CODE();  
C#24=ORGANIZATION('ANALOGY Inc.', 'P.O. Box 1669, Beaverton, OR, 97075-1669');  
C#25=COORDINATED_CHARACTERISTIC((#26,#31),'voltage rating');  
C#26=CHARACTERISTIC('resistance',#27,#30);  
C#27=EE_TOLERANCE(#28,#29);  
C#28=EE_MEASURE(90,'kohms');  
C#29=EE_MEASURE(110,'kohms');  
C#30=EE_MEASURE(100,'kohms');  
C#31=CHARACTERISTIC('wattage',#32,#33);  
C#32=EE_TOLERANCE(#33,#33);  
C#33=EE_MEASURE(0.25,'watt');  
C#34=COORDINATED_NUMERIC_PARAMETER((#35,#36),'voltage rating');  
C#35=NUMERIC_PARAMETER(#30,'resistance',#27);
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C#36=NUMERIC_PARAMETER(#33,'wattage',#32);
C#37=EE_DOCUMENT($,#8,(#38),(#12,#13),#10,$,'MIL-R-39017E',#9);
C#38=EE_TEXT('Standardization of Resistor,Film components');
C#39=PART_ASSOCIATION(#4,#40,(#1));
C#40=DESIGN_SPECIFICATION($,$,(#41),$,#42,#43,'Component level EMI reduction',#44,$,#45);
C#41=EE_TEXT('Reduce EMI emissions','Reduce potential for CROSS TALK');
C#42=DATE0;
C#43=ACCESS_CODE0;
C#44=PERSON(#45,'Tom Thurman',$);
C#45=ORGANIZATION('Rockwell Collins','Cedar Rapids, IO');
ENDSEC;
END-STEP_WORKING_SESSION;
```

:::::::::::::
part.three
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STEP_WORKING_SESSION;  
HEADER;  
FILE_DESCRIPTION(("Test Case 5c"),' ');  
FILE_NAME('part.three','1994-04-11 15:39:16',('James J. Kachmarsky'),('Tobyhanna Army  
Depot'),'', 'dp_sum_86.01', '');  
FILE_SCHEMA(('Part UoF','Pcb UoF','Geom UoF','Util UoF'));  
ENDSEC;  
DATA;  
C#1=PRINTED_PART($,$,$,$,$,$,$,$,'printed cap',(#2,#8,#13),#14);  
C#2=DESIGN_LAYER_STRATUM((#3),'printed layer 1','conductive paste',#6,#7,'printed part');  
C#3=PCB_CURVE_LOOP(T.,#4,(#5));  
C#4=EE_TOLERANCE($,$);  
C#5=CURVE0;  
C#6=EE_TOLERANCE($,$);  
C#7=EE_MEASURE(0.005,'inches');  
C#8=DESIGN_LAYER_STRATUM((#9),'printed layer 2','dielectric paste',#12,#7,'printed part');  
C#9=PCB_CURVE_LOOP(T.,#10,(#11));  
C#10=EE_TOLERANCE($,$);  
C#11=CURVE0;  
C#12=EE_TOLERANCE($,$);  
C#13=DESIGN_LAYER_STRATUM((#3),'printed layer 3','conductive paste',#6,#7,'printed part');  
I#14=RESTRICTION_PASSAGE(F.,#13,#2,#15,#16,'clearance',$,#18);  
C#15=EE_TOLERANCE($,$);  
C#16=PCB_CURVE_LOOP(T.,#15,(#17));  
C#17=CURVE0;  
C#18=EE_TEXT('Keep Out Area for other passage types');  
C#19=PRINTED_PART_TERMINATION('one',#1,(#20));  
C#20=PCB_CURVE_LOOP(T.,#21,(#22));  
C#21=EE_TOLERANCE($,$);  
C#22=CURVE0;  
C#23=PRINTED_PART_TERMINATION('two',#1,(#24));  
C#24=PCB_CURVE_LOOP(T.,#21,(#25));  
C#25=CURVE0;  
ENDSEC;  
END-STEP_WORKING_SESSION;
```

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:::::::::::  
part.two  
:::::::
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```
STEP_WORKING_SESSION;  
HEADER;  
FILE_DESCRIPTION(("Test Case 5b"),' ');  
FILE_NAME('part.two','1994-03-22 09:24:19','(James J. Kachmarsky)',('Tobyhanna Army Depot'),'  
'dp_sum_86.01','');  
FILE_SCHEMA((Part UoF,'Geom UoF','Util UoF','Rqmt UoF'));  
ENDSEC;  
DATA;  
C#1=PACKAGED_PART(#1015),#1005,(#1026,#1031),(#1034),(#1037),$,#1006,'RLR07C1003KN',  
$);  
C#1004=PCA_PART((#1015),#1005,(#1026,#1031),(#1034),(#1037),$,#1006,'RLR07C1003KN');  
C#1005=TECHNOLOGY('Passive Electronic Components','Film','?');  
C#1006=EE_MATERIAL($,'resistive film',$,$,#1007);  
C#1007=MATERIAL_SPECIFICATION($,#1008,(#1011),$,#1012,#1014,'MIL-R-39017E',#1009,'?',#  
1009);  
C#1008=EE_APPROVAL('Standardize Film Resistors',#1009,,T.,#1010);  
C#1009=ORGANIZATION('US Army Laboratory Command','ATTN: SLCET-R-S, Fort Monmouth,  
NJ, 07703-5000');  
C#1010=DATE();  
C#1011=EE_TEXT('use of any material inorder to meet the design paramteres');  
C#1012=DATE();  
C#1013=DATE();  
C#1014=ACCESS_CODE();  
C#1015=ANALYTIC_MODEL($,$,(#1016,#1021),$,#1017,#1018,'rlr07c',#1019,#1020,(#1025));  
C#1016=EE_TEXT('Fixed 1/4 watt resistor');  
C#1017=DATE();  
C#1018=ACCESS_CODE();  
C#1019=ORGANIZATION('Tobyhanna Army Depot','11 Midway Road, ATTN: SDSTO-ME-F,  
Tobyhanna, PA, 18466-5075');  
C#1020=LANGUAGE_REFERENCE_MANUAL($,$,(#1021),$,#1022,$,'SABER',#1024,$,#1024);  
C#1021=EE_TEXT('SABER Version 2.2');  
C#1022=DATE();  
C#1023=ACCESS_CODE();  
C#1024=ORGANIZATION('ANALOGY Inc.', 'P.O. Box 1669, Beaverton, OR, 97075-1669');  
C#1025=COORDINATED_CHARACTERISTIC((#1026,#1031),'electrical prarmeters');  
C#1026=CHARACTERISTIC('resistance',#1027,#1030);  
C#1027=EE_TOLERANCE(#1028,#1029);  
C#1028=EE_MEASURE(90,'kohms');  
C#1029=EE_MEASURE(110,'kohms');  
C#1030=EE_MEASURE(100,'kohms');  
C#1031=CHARACTERISTIC('wattage',#1032,#1033);  
C#1032=EE_TOLERANCE(#1033,#1033);  
C#1033=EE_MEASURE(0.25,'watt');  
C#1034=COORDINATED_NUMERIC_PARAMETER((#1035,#1036),'voltage rating');  
C#1035=NUMERIC_PARAMETER(#1030,'resistance',#1027);
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C#1036=NUMERIC_PARAMETER(#1033,'wattage',#1032);
C#1037=EE_DOCUMENT($,#1008,(#1038),(#1012,#1013),#1010,$,'MIL-R-39017E',#1009);
C#1038=EE_TEXT("Standardization of Resistor,Film components");
C#1039=PART_ASSOCIATION(#1004,#1040,($));
C#1040=DESIGN_SPECIFICATION($,$,(#1041),$,#1042,#1043,'Component      level      EMI
reduction',#1044,$,#1045);
C#1041=EE_TEXT("Reduce EMI emissions",'Reduce potential for CROSS TALK');
C#1042=DATE();
C#1043=ACCESS_CODE();
C#1044=PERSON(#1045,'Tom Thurman',$);
C#1045=ORGANIZATION('Rockwell Collins','Cedar Rapids, IO');
C#1046=PACKAGE($,$,$,$,$,'rlr07');
C#1047=PACKAGE_BODY($,$,$,$,(#1037),$,#1048);
C#1048=EE_MATERIAL($,'epoxy',$,$,#1049);
C#1049=MATERIAL_SPECIFICATION($,#1008,(#1011),$,#1010,#1014,'MIL-R-39017E',#1009,$,#1
009);
C#1050=EE_DEVICE(#1015),#1005,(#1026),(#1034),(#1037),$,'resistive      film','film
deposition','rlr07');
C#1051=TERMINAL($,#1057,$,$,(#1072),$,#1058,#1065,#1052,#1053);
C#1052=EE_TEXT("Standard Lead");
C#1053=EE_MATERIAL($,'Copper Nickel Tin Alloy 725',$,$,#1054);
C#1054=MATERIAL_SPECIFICATION($,$,(#1055),$,#1056,$,'MIL-STD-1276',#1009,$,#1009);
C#1055=EE_TEXT("Lead specification for electronic components");
C#1056=DATE();
C#1057=TECHNOLOGY('metal forming','draw','drawing of ductile metals and their alloys');
C#1058=PCB_CURVE_LOOP(T.,#1059,(#1062,#1063,#1064));
C#1059=EE_TOLERANCE(#1060,#1061);
C#1060=EE_MEASURE(1.375,'inches');
C#1061=EE_MEASURE(1.625,'inches');
C#1062=CURVE();
C#1063=CURVE();
C#1064=CURVE();
C#1065=PCB_CURVE_LOOP(T.,#1066,(#1069,#1070,#1071));
C#1066=EE_TOLERANCE(#1067,#1068);
C#1067=EE_MEASURE(0.1,'inches');
C#1068=EE_MEASURE(0.102,'inches');
C#1069=CURVE();
C#1070=CURVE();
C#1071=CURVE();
C#1072=EE_DOCUMENT($,#1008,(#1038),$,#1073,$,'MIL-R-39017E/1N',#1009);
C#1073=DATE();
C#1074=PREPARED_TERMINAL($,#1057,$,$,(#1082),$,#1076,#1159,#1075,#1053,#1051);
C#1075=EE_TEXT("Horizontal Mounting");
C#1076=PCB_CURVE_LOOP(T.,#1077,(#1078,#1079,#1080));
C#1077=EE_TOLERANCE($,$);
C#1078=CURVE();
C#1079=CURVE();
C#1080=CURVE();
C#1081=PREPARED_TERMINAL($,#1057,$,$,(#1082),$,#1086,#1159,#1075,#1053,#1051);

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C#1082=EE_DOCUMENT($,$,(#1083),$,#1084,$,'MIL-C-28809',#1085);
C#1083=EE_TEXT("Electrical Component Mounting");
C#1084=DATE();
C#1085=ORGANIZATION('Space and Naval Warfare Systems Command','ATTN: SPAWAR
003-1212, Washington DC, 20363-5100');
C#1086=PCB_CURVE_LOOP(.T.,#1087,(#1088,#1089,#1090));
C#1087=EE_TOLERANCE($,$);
C#1088=CURVE0;
C#1089=CURVE0;
C#1090=CURVE0;
C#1091=PACKAGING_RELATIONSHIP($,#1,$,#1050);
C#1092=PACKAGED_PART_TERMINATION(#1093,#1098,.F.,#1,'one');
C#1093=PHYSICAL_DEVICE_PORT(#1050,'one',(#1094));
C#1094=PCB_CURVE_LOOP(.T.,#1095,(#1096,#1097));
C#1095=EE_TOLERANCE($,$);
C#1096=CURVE0;
C#1097=CURVE0;
C#1098=PACKAGE_TERMINATION(#1051,#1047,#1099,#1046);
C#1099=AXIS_PLACEMENT(#1100,#1101);
C#1100=ORIENTATION((1,1,1));
C#1101=CARTESIAN_POINT((#1102,#1103,#1103));
C#1102=EE_MEASURE(1.5,'inches');
C#1103=EE_MEASURE(0.045,'inches');
C#1104=PACKAGED_PART_TERMINATION(#1105,#1110,.F.,#1,'two');
C#1105=PHYSICAL_DEVICE_PORT(#1050,'two',(#1106));
C#1106=PCB_CURVE_LOOP(.T.,#1107,(#1108,#1109));
C#1107=EE_TOLERANCE($,$);
C#1108=CURVE0;
C#1109=CURVE0;
C#1110=PACKAGE_TERMINATION(#1051,#1047,#1111,#1046);
C#1111=AXIS_PLACEMENT(#1112,#1113);
C#1112=ORIENTATION((-1,1,1));
C#1113=CARTESIAN_POINT((#1114,#1115,#1115));
C#1114=EE_MEASURE(1.75,'inches');
C#1115=EE_MEASURE(0.045,'inches');
C#1116=PACKAGED_PART_TERMINATION(#1093,#1117,.F.,#1,'one');
C#1117=PACKAGE_TERMINATION(#1074,#1047,#1099,#1046);
C#1118=PACKAGED_PART_TERMINATION(#1105,#1119,.F.,#1,'two');
C#1119=PACKAGE_TERMINATION(#1081,#1047,#1111,#1046);
C#1120=PACKAGED_COMPONENT(#1004,$,$,$,'R1');
C#1121=PACKAGED_COMPONENT_TERMINATION(#1120,#1116);
C#1122=PACKAGED_COMPONENT_TERMINATION(#1120,#1118);
C#1123=PACKAGED_COMPONENT(#1004,$,$,$,'R2');
C#1124=PACKAGED_COMPONENT_TERMINATION(#1123,#1125);
C#1125=PACKAGED_PART_TERMINATION(#1093,#1126,.F.,#1,'one');
C#1126=PACKAGE_TERMINATION(#1133,#1047,#1127,#1046);
C#1127=AXIS_PLACEMENT(#1128,#1129);
C#1128=ORIENTATION((1,-1,1));
C#1129=CARTESIAN_POINT((#1130,#1131,#1132));
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C#1130=EE_MEASURE(0.25,'inches');
C#1131=EE_MEASURE(0.55,'inches');
C#1132=EE_MEASURE(0.25,'inches');
C#1133=PREPARED_TERMINAL($,#1057,$,$,(#1082),$,#1135,#1159,#1134,#1053,#1051);
C#1134=EE_TEXT(("Hairpin mounting"));
C#1135=PCB_CURVE_LOOP(T.,#1136,(#1139,#1140,#1141));
C#1136=EE_TOLERANCE($,$);
C#1139=CURVE0;
C#1140=CURVE0;
C#1141=CURVE0;
C#1142=PACKAGED_COMPONENT_TERMINATION(#1123,#1143);
C#1143=PACKAGED_PART_TERMINATION(#1105,#1144,.F.,#1,'two');
C#1144=PACKAGE_TERMINATION(#1145,#1047,#1153,#1046);
C#1145=PREPARED_TERMINAL($,#1057,$,$,(#1082),$,#1146,#1159,#1134,#1053,#1051);
C#1146=PCB_CURVE_LOOP(T.,#1147,(#1150,#1151,#1152));
C#1147=EE_TOLERANCE($,$);
D#1148=EE_MEASURE($,$);
D#1149=EE_MEASURE($,$);
C#1150=CURVE0;
C#1151=CURVE0;
C#1152=CURVE0;
C#1153=AXIS_PLACEMENT(#1154,#1155);
C#1154=ORIENTATION((1,1,-1));
C#1155=CARTESIAN_POINT((#1156,#1157,#1158));
C#1156=EE_MEASURE(0.25,'inches');
C#1157=EE_MEASURE(0,'inches');
C#1158=EE_MEASURE(0.25,'inches');
C#1159=PCB_CURVE_LOOP(T.,#1077,(#1160,#1161,#1162));
C#1160=CURVE0;
C#1161=CURVE0;
C#1162=CURVE0;
ENDSEC;
END-STEP_WORKING_SESSION;
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:::::::::::
pca.one
:::::::

STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION(("Test Case 6a"),' ');\nFILE_NAME('pca.one','1994-03-24 09:01:43',(James J. Kachmarsky),(Tobyhanna Army Depot),'\n','dp_sum_86.01',' ');\nFILE_SCHEMA((PCA_UoF','Part_UoF','Util_UoF'));\nENDSEC;
DATA;
C#1=PCA_COMPONENT(#2,\$,\$,\$,'U1');
C#2=PACKAGED_PART(\$,#3,\$,\$,\$,\$,#4,'54LS00',#5);
C#3=TECHNOLOGY('Dual Inline Package','?','?');
C#4=EE_MATERIAL(\$,'cerramic',\$,\$,\$);
C#5=EE_MATERIAL(\$,'goop',\$,\$,\$);
C#14=PACKAGED_COMPONENT_TERMINATION(#15,#20);
C#15=PACKAGED_COMPONENT(#16,\$,\$,\$,'U1');
C#16=PACKAGED_PART(\$,#17,\$,\$,\$,\$,#18,'54LS00',#19);
C#17=TECHNOLOGY('Dual Inline Package','?','?');
C#18=EE_MATERIAL(\$,'cerramic',\$,\$,\$);
C#19=EE_MATERIAL(\$,'goop',\$,\$,\$);
C#20=PACKAGED_PART_TERMINATION(#21,#24,.T.,#16,'IN1 A');
C#21=PHYSICAL_DEVICE_PORT(#22,'ONE',\$);
C#22=EE_DEVICE(\$,#23,\$,\$,\$,\$,'Silicon','Ion Implantation','LS00');
C#23=TECHNOLOGY('Transistor Transistor Logic','Ion Implantation','?');
I#24=PACKAGE_TERMINATION(#25,#29,\$,#32);
I#25=TERMINAL(\$,\$,\$,\$,\$,\$,\$,\$,\$,\$,#28);
C#26=TECHNOLOGY('lead','extrusion','?');
C#27=EE_TEXT(("Standard DIP"));
C#28=EE_MATERIAL(\$,'Copper Nickel Tin Alloy 725',\$,\$,#178);
C#29=PACKAGE_BODY(\$,#30,\$,\$,\$,\$,\$,\$,#31);
C#30=TECHNOLOGY('?','?','?');
C#31=EE_MATERIAL(\$,'cerramic',\$,\$,\$);
C#32=PACKAGE(\$,#17,\$,\$,\$,\$,'DIP 14');
C#33=PACKAGED_COMPONENT_TERMINATION(#15,#34);
C#34=PACKAGED_PART_TERMINATION(#35,#36,.F.,#16,'IN2 A');
C#35=PHYSICAL_DEVICE_PORT(#22,'TWO',\$);
I#36=PACKAGE_TERMINATION(#25,#29,\$,#32);
C#37=PACKAGED_COMPONENT_TERMINATION(#15,#38);
C#38=PACKAGED_PART_TERMINATION(#39,#40,.F.,#16,'OUT A');
C#39=PHYSICAL_DEVICE_PORT(#22,'THREE',\$);
I#40=PACKAGE_TERMINATION(#25,#29,\$,#32);
C#41=PACKAGED_COMPONENT_TERMINATION(#15,#42);
C#42=PACKAGED_PART_TERMINATION(#43,#44,.F.,#16,'IN1 B');
C#43=PHYSICAL_DEVICE_PORT(#22,'FOUR',\$);
I#44=PACKAGE_TERMINATION(#25,#29,\$,#32);
C#45=PACKAGED_COMPONENT_TERMINATION(#15,#46);

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C#46=PACKAGED_PART_TERMINATION(#47,#48,.F.,#16,'IN2 B');
C#47=PHYSICAL_DEVICE_PORT(#22,'FIVE',$);
I#48=PACKAGE_TERMINATION(#25,#29,$,#32);
C#49=PACKAGED_COMPONENT_TERMINATION(#15,#50);
C#50=PACKAGED_PART_TERMINATION(#51,#52,.F.,#16,'OUT B');
C#51=PHYSICAL_DEVICE_PORT(#22,'SIX',$);
I#52=PACKAGE_TERMINATION(#25,#29,$,#32);
C#54=PACKAGED_COMPONENT_TERMINATION(#15,#55);
C#55=PACKAGED_PART_TERMINATION(#56,#57,.F.,#16,'IN1 C');
C#56=PHYSICAL_DEVICE_PORT(#22,'EIGHT',$);
I#57=PACKAGE_TERMINATION(#25,#29,$,#32);
C#58=PACKAGED_COMPONENT_TERMINATION(#15,#59);
C#59=PACKAGED_PART_TERMINATION(#60,#61,.F.,#16,'IN 2 C');
C#60=PHYSICAL_DEVICE_PORT(#22,'NINE',$);
I#61=PACKAGE_TERMINATION(#25,#29,$,#32);
C#62=PACKAGED_COMPONENT_TERMINATION(#15,#63);
C#63=PACKAGED_PART_TERMINATION(#64,#65,.F.,#16,'OUT C');
C#64=PHYSICAL_DEVICE_PORT(#22,'TEN',$);
I#65=PACKAGE_TERMINATION(#25,#29,$,#32);
C#66=PACKAGED_COMPONENT_TERMINATION(#15,#67);
C#67=PACKAGED_PART_TERMINATION(#68,#69,.F.,#16,'IN1 D');
C#68=PHYSICAL_DEVICE_PORT(#22,'ELEVEN',$);
I#69=PACKAGE_TERMINATION(#25,#29,$,#32);
C#70=PACKAGED_COMPONENT_TERMINATION(#15,#71);
C#71=PACKAGED_PART_TERMINATION(#72,#73,.F.,#16,'IN2 D');
C#72=PHYSICAL_DEVICE_PORT(#22,'TEWELVE',$);
I#73=PACKAGE_TERMINATION(#25,#29,$,#32);
C#74=PACKAGED_COMPONENT_TERMINATION(#15,#75);
C#75=PACKAGED_PART_TERMINATION(#76,#77,.F.,#16,'OUT D');
C#76=PHYSICAL_DEVICE_PORT(#22,'THIRTEEN',$);
I#77=PACKAGE_TERMINATION(#25,#29,$,#32);
C#78=PACKAGED_COMPONENT_TERMINATION(#93,#94);
C#79=PACKAGED_PART_TERMINATION(#80,#81,.F.,#16,'GND');
C#80=PHYSICAL_DEVICE_PORT(#22,'SEVEN',$);
I#81=PACKAGE_TERMINATION(#25,#29,$,#32);
C#82=PACKAGED_COMPONENT_TERMINATION(#15,#83);
C#83=PACKAGED_PART_TERMINATION(#84,#85,.F.,#16,'VCC');
C#84=PHYSICAL_DEVICE_PORT(#22,'FOURTEEN',$);
I#85=PACKAGE_TERMINATION(#25,#29,$,#32);
C#86=PACKAGED_PART($,#87,$,$,$,$,#88,'socket 14 pin',$);
C#87=TECHNOLOGY('molding','injection','plastic');
C#88=EE_MATERIAL($,'Plastic',$,$,$);
C#89=PCA_COMPONENT(#86,$,$,$,'XU1');
C#90=PACKAGED_PART($,#91,$,$,$,$,#92,'socket 14 pin DIP',$);
C#91=TECHNOLOGY('mold','injection','plastic');
C#92=EE_MATERIAL($,'plastic',$,$,$);
C#93=PACKAGED_COMPONENT(#90,$,$,$,'XU1');
C#94=PACKAGED_PART_TERMINATION(#95,#96,.T.,#86,'1');
C#95=PHYSICAL_DEVICE_PORT(#157,'ONE',(#158,#165));

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I#96=PACKAGE_TERMINATION(#97,#101,$,#104);
I#97=TERMINAL($,#98,$,$,$,$,#173,#158,$,#28);
C#98=TECHNOLOGY('lead','extrusion','?');
C#101=PACKAGE_BODY($,#102,$,$,$,$,#103);
C#102=TECHNOLOGY('molding','injection','plastic');
C#103=EE_MATERIAL($,'plastic',$,$,$);
C#104=PACKAGE($,#91,$,$,$,$,'socket 14 pin DIP');
C#105=PACKAGED_COMPONENT_TERMINATION(#93,#106);
C#106=PACKAGED_PART_TERMINATION(#107,#108,.F.,#86,'2');
C#107=PHYSICAL_DEVICE_PORT(#157,'TWO',(#158,#165));
I#108=PACKAGE_TERMINATION(#97,#101,$,#104);
C#109=PACKAGED_COMPONENT_TERMINATION(#93,#110);
C#110=PACKAGED_PART_TERMINATION(#111,#112,.F.,#86,'3');
C#111=PHYSICAL_DEVICE_PORT(#157,'THREE',(#158,#165));
I#112=PACKAGE_TERMINATION(#97,#101,$,#104);
C#113=PACKAGED_COMPONENT_TERMINATION(#93,#114);
C#114=PACKAGED_PART_TERMINATION(#115,#116,.F.,#86,'4');
C#115=PHYSICAL_DEVICE_PORT(#157,'FOUR',(#158,#165));
I#116=PACKAGE_TERMINATION(#97,#101,$,#104);
C#117=PACKAGED_COMPONENT_TERMINATION(#93,#118);
C#118=PACKAGED_PART_TERMINATION(#119,#120,.F.,#86,'5');
C#119=PHYSICAL_DEVICE_PORT(#157,'FIVE',(#158,#165));
I#120=PACKAGE_TERMINATION(#97,#101,$,#104);
C#121=PACKAGED_COMPONENT_TERMINATION(#93,#122);
C#122=PACKAGED_PART_TERMINATION(#123,#124,.F.,#86,'6');
C#123=PHYSICAL_DEVICE_PORT(#157,'SIX',(#158,#165));
I#124=PACKAGE_TERMINATION(#97,#101,$,#104);
C#125=PACKAGED_COMPONENT_TERMINATION(#93,#126);
C#126=PACKAGED_PART_TERMINATION(#127,#128,.F.,#86,'8');
C#127=PHYSICAL_DEVICE_PORT(#157,'EIGHT',$);
I#128=PACKAGE_TERMINATION(#97,#101,$,#104);
C#129=PACKAGED_COMPONENT_TERMINATION(#93,#130);
C#130=PACKAGED_PART_TERMINATION(#131,#132,.F.,#86,'9');
C#131=PHYSICAL_DEVICE_PORT(#157,'NINE',(#158,#165));
I#132=PACKAGE_TERMINATION(#97,#101,$,#104);
C#133=PACKAGED_COMPONENT_TERMINATION(#93,#134);
C#134=PACKAGED_PART_TERMINATION(#135,#136,.F.,#86,'10');
C#135=PHYSICAL_DEVICE_PORT(#157,'TEN',(#158,#165));
I#136=PACKAGE_TERMINATION(#97,#101,$,#104);
C#137=PACKAGED_COMPONENT_TERMINATION(#93,#138);
C#138=PACKAGED_PART_TERMINATION(#139,#140,.F.,#86,'11');
C#139=PHYSICAL_DEVICE_PORT(#157,'ELEVEN',(#158,#165));
I#140=PACKAGE_TERMINATION(#97,#101,$,#104);
C#141=PACKAGED_COMPONENT_TERMINATION(#93,#142);
C#142=PACKAGED_PART_TERMINATION(#143,#144,.F.,#86,'12');
C#143=PHYSICAL_DEVICE_PORT(#157,'TEWELVE',(#158,#165));
I#144=PACKAGE_TERMINATION(#97,#101,$,#104);
C#145=PACKAGED_COMPONENT_TERMINATION(#93,#146);
C#146=PACKAGED_PART_TERMINATION(#147,#148,.F.,#86,'13');
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C#147=PHYSICAL_DEVICE_PORT(#157,'THIRTEEN',(#158,#165));
I#148=PACKAGE_TERMINATION(#97,#101,$,#104);
C#149=PACKAGED_COMPONENT_TERMINATION(#93,#150);
C#150=PACKAGED_PART_TERMINATION(#151,#152,.F.,#86,'7');
C#151=PHYSICAL_DEVICE_PORT(#157,'SEVEN',(#158,#165));
I#152=PACKAGE_TERMINATION(#97,#101,$,#104);
C#153=PACKAGED_COMPONENT_TERMINATION(#93,#154);
C#154=PACKAGED_PART_TERMINATION(#155,#156,.F.,#86,'14');
C#155=PHYSICAL_DEVICE_PORT(#157,'FOURTEEN',(#158,#165));
I#156=PACKAGE_TERMINATION(#97,#101,$,#104);
C#157=EE_DEVICE($,$,$,$,$,$,$,'socket');
C#158=PCB_CURVE_LOOP(T.,#159,(#162,#163,#164));
C#159=EE_TOLERANCE(#160,#161);
I#160=EE_MEASURE($,$);
I#161=EE_MEASURE($,$);
C#162=CURVE0;
C#163=CURVE0;
C#164=CURVE0;
C#165=PCB_CURVE_LOOP(T.,#166,(#169,#170,#171));
C#166=EE_TOLERANCE(#167,#168);
I#167=EE_MEASURE($,$);
I#168=EE_MEASURE($,$);
C#169=CURVE0;
C#170=CURVE0;
C#171=CURVE0;
C#172=EE_TEXT('Standard Dip Socket');
C#173=PCB_CURVE_LOOP(T.,#174,(#175,#176,#177));
C#174=EE_TOLERANCE($,$);
C#175=CURVE0;
C#176=CURVE0;
C#177=CURVE0;
C#178=MATERIAL_SPECIFICATION($,$,(#179),$,#180,$,'MIL-STD-1276',#181,$,#181);
C#179=EE_TEXT('Lead specification for electronic components');
C#180=DATE0;
C#181=ORGANIZATION('Us Army Laboratory Command',ATTN: SLCET-R-S, Fort Monmouth, NJ,
07703-5000);
C#182=COMPONENT_SUB_ASSY_RELATIONSHIP(#89),#1);
ENDSEC;
END-STEP_WORKING_SESSION;
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rqmt.four  
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STEP_WORKING_SESSION;  
HEADER;  
FILE_DESCRIPTION(("Test Case 8d",' '));  
FILE_NAME('rqmt.four','1994-04-12 10:21:12','(James J. Kachmarsky'),('Tobyhanna Army Depot'),'  
'dp_sum_86.01',' ');  
FILE_SCHEMA((Rqmt UoF,'Util UoF','Part UoF','Pca UoF','Pcb UoF'));  
ENDSEC;  
DATA;  
C#1=EE_DOCUMENT($,#2,(#5),$,#6,#7,'DAA07-94-I-0001',#8);  
C#2=EE_APPROVAL('Planned Product Improvement',#3,.T.,#4);  
C#3=ORGANIZATION('Program Office: Field Airborne Reconnaissance Tracking System','ATTN:  
PO-FARTS, Fort Monmouth, NJ, 07703-5000');  
C#4=DATE0;  
C#5=EE_TEXT(('Contract for Development and Production of Improvements to base FART'));  
C#6=DATE0;  
C#7=ACCESS_CODE0;  
C#8=PERSON(#3,'Contract Officer','ATTN: PO-FARTS-K');  
C#9=DESIGN_SPECIFICATION($,#2,(#5,#10,#11,#12),$,#6,#7,'DAA07-94-I-0001',#8,$,#3);  
C#10=EE_TEXT('Increase Range to 10 miles');  
C#11=EE_TEXT('Develop a multiplxer capable of controlling upto four systems','Develop a signal  
processing device for displaying the data from upto four systems'));  
C#12=EE_TEXT('The signal processing device must meet the module interface requirements of  
the Field Intelligence Terminal'));  
C#13=INTERFACE_SPECIFICATION($,$,(#14),$,#15,#16,'MIL-I-XXXX',#17,$,#17);  
C#14=EE_TEXT('Field Intelligence Terminal module'));  
C#15=DATE0;  
C#16=ACCESS_CODE0;  
C#17=ORGANIZATION('Program Office: Field Intelligence Terminal','ATTN: PO-FIT, Fort  
Monmouth, NJ, 07703-5000');  
C#18=INTERFACE_REQUIREMENT(#9,#13,$,$,$,(#23,#25,#27,#29,#31,#33,#35,#37),$,(#48,#50)  
,#22,#19);  
C#19=CONFIGURED_INTERFACE(#20);  
C#20=EE_PRODUCT_VERSION(#21,#17,$,$,$,#16,'B'.RELEASED.);  
C#21=EE_PRODUCT('AN/TSQ-1','Field  
Terminal',#17,'SM-D-444447',.F.,'government');  
Intelligence  
C#22=EE_TEXT('Any module which is to operate in the AN/TSQ-1 must meet MIL-I-XXXX'));  
C#23=CHARACTERISTIC('Connector',$,#24);  
C#24=STRING_PROPERTY('3 rows of 40 .025 square pins spaced 0.100 apart');  
C#25=CHARACTERISTIC('Device Address',$,#26);  
C#26=STRING_PROPERTY('Row 1,pins 1 to 8 inclusive');  
C#27=CHARACTERISTIC('Device Data',$,#28);  
C#28=STRING_PROPERTY('Row 1, pins 9 to 40 and Row 2, pins 9 to 40 inclusive');  
C#29=CHARACTERISTIC('Device power',$,#30);  
C#30=STRING_PROPERTY('Row 3, pins 1 to 4 inclusive, Ground');  
C#31=CHARACTERISTIC('Device Power',$,#32);
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C#32=STRING_PROPERTY('Row 2, pin 1, +5 VDC');
C#33=CHARACTERISTIC('Device Power',S,#34);
C#34=STRING_PROPERTY('Row 2, pin 2, +15 VDC');
C#35=CHARACTERISTIC('Device Power',S,#36);
C#36=STRING_PROPERTY('Row 2, pin 3, -15 VDC');
C#37=CHARACTERISTIC('Device Reserved',S,#38);
C#38=STRING_PROPERTY('Row 3, pins 5 to 40 inclusive, future expansion');

C#39=EE_PRODUCT('Signal Processor/Display Driver','FIT
module',#40,'SP/DD-001',.F.,'assembly');
C#40=ORGANIZATION('Martin Marietta', 'Orlando FL');
C#41=EE_PRODUCT_DEFINITION(#42,'sp_dd','spdd001','Display data from upto four seperate
sources and work within the AN/TSQ-1',#44,S,(#45));
C#42=EE_PRODUCT_VERSION(#39,#40,S,S,'DAA07-94-I-0001',#43,'A',.UNRELEASED.);
C#43=ACCESS_CODE();
C#44=DATE();
C#45=PERSON(#40,'Steve Grout',S);
C#46=DESIGNED_PCA_PART(#42,'sp_dd_interface','spdd001int','Display data from upto four
seperate sources and work within the AN/TSQ-1 ',#44,S,(#45));
C#47=PCA($,$,$,$,$,$,$,'SP/DD-001-A1',(#13));
C#48=PCA_PART($,$,$,$,$,$,$,'AMP-40X3-025-P');
C#49=CONNECTOR_COMPONENT(#48,'P1');
C#50=PCA_PART($,$,$,$,$,$,$,'AMP-40X3-025-S');
C#51=CONNECTOR_COMPONENT(#50,'J1');
C#52=CONNECTOR_TERMINATION(#53,#49,'ADDR00',#74);
C#53=PACKAGED_PART_TERMINATION(#54,#70,.T.,#73,'A1');
C#54=PHYSICAL_DEVICE_PORT(#55,'A1',(#56));
C#55=EE_DEVICE($,$,$,$,$,$,$,'connector');
C#56=PCB_CURVE_LOOP(.F.,#57,(#60,#61,#62));
C#57=EE_TOLERANCE(#58,#59);

I#58=EE_MEASURE($,$);
I#59=EE_MEASURE($,$);
C#60=CURVE0;
C#61=CURVE0;
C#62=CURVE0;
C#63=PCB_CURVE_LOOP(.T.,#64,(#67,#68,#69));
C#64=EE_TOLERANCE(#65,#66);
I#65=EE_MEASURE($,$);
I#66=EE_MEASURE($,$);
C#67=CURVE0;
C#68=CURVE0;
C#69=CURVE0;
C#70=PACKAGE_TERMINATION(#71,#77,#79,#83);
C#71=TERMINAL($,$,$,$,$,$,#63,#56,$,#72);
C#72=EE_MATERIAL($,'Copper Nickel Tin 725 Alloy',S,$,$);
C#73=PACKAGED_PART($,$,$,$,$,$,$,'AMP-40X3-025-P',S);
C#74=REQUIREMENT_OCCURRENCE(#75);
C#75=DECOMPOSABLE_REQUIREMENT(#9,#13,$,$,$,$,$,$,(#48,#50),#76);
C#76=EE_TEXT('Address Line definition 00 to 07');
C#77=PACKAGE_BODY($,$,$,$,$,$,#78);

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C#78=EE_MATERIAL($,'plastic',$,$,$);
C#79=AXIS_PLACEMENT(#80,#81);
C#80=ORIENTATION((1,1,1));
C#81=CARTESIAN_POINT((#82,#82,#82));
C#82=EE_MEASURE(0,'inches');
C#83=PACKAGE($,$,$,$,$,$,'connector');
C#84=CONNECTOR_TERMINATION(#85,#49,'ADDR01',#74);
C#85=PACKAGED_PART_TERMINATION(#86,#87,.F.,#73,'A2');
C#86=PHYSICAL_DEVICE_PORT(#55,'A2',(#56));
C#87=PACKAGE_TERMINATION(#71,#77,#88,#83);
C#88=AXIS_PLACEMENT(#89,#90);
C#89=ORIENTATION((1,1,1));
C#90=CARTESIAN_POINT((#91,#82,#82));
C#91=EE_MEASURE(0.1,'inches');
C#92=CONNECTOR_TERMINATION(#93,#49,'ADDR02',#74);
C#93=PACKAGED_PART_TERMINATION(#94,#95,.F.,#73,'A3');
C#94=PHYSICAL_DEVICE_PORT(#55,'A3',(#56));
C#95=PACKAGE_TERMINATION(#71,#77,#96,#83);
C#96=AXIS_PLACEMENT(#97,#98);
C#97=ORIENTATION((1,1,1));
C#98=CARTESIAN_POINT((#99,#82,#82));
C#99=EE_MEASURE(0.2,'inches');
C#100=CONNECTOR_TERMINATION(#101,#49,'ADDR03',#74);
C#101=PACKAGED_PART_TERMINATION(#102,#103,.F.,#73,'A4');
C#102=PHYSICAL_DEVICE_PORT(#55,'A4',(#56));
C#103=PACKAGE_TERMINATION(#71,#77,#104,#83);
C#104=AXIS_PLACEMENT(#105,#106);
C#105=ORIENTATION((1,1,1));
C#106=CARTESIAN_POINT((#107,#82,#82));
C#107=EE_MEASURE(0.3,'inches');
C#108=CONNECTOR_TERMINATION(#109,#49,'ADDR04',$);
C#109=PACKAGED_PART_TERMINATION(#110,#111,.F.,#73,'A5');
C#110=PHYSICAL_DEVICE_PORT(#55,'A5',(#56));
C#111=PACKAGE_TERMINATION(#71,#77,#112,#83);
C#112=AXIS_PLACEMENT(#113,#114);
C#113=ORIENTATION((1,1,1));
C#114=CARTESIAN_POINT((#115,#82,#82));
C#115=EE_MEASURE(0.4,'inches');
C#116=CONNECTOR_TERMINATION(#117,#49,'ADDR05',#74);
C#117=PACKAGED_PART_TERMINATION(#118,#119,.F.,#73,'A6');
C#118=PHYSICAL_DEVICE_PORT(#55,'A6',(#56));
C#119=PACKAGE_TERMINATION(#71,#77,#120,#83);
C#120=AXIS_PLACEMENT(#121,#122);
C#121=ORIENTATION((1,1,1));
C#122=CARTESIAN_POINT((#123,#82,#82));
C#123=EE_MEASURE(0.5,'inches');
C#124=CONNECTOR_TERMINATION(#125,#49,'ADDR06',#74);
C#125=PACKAGED_PART_TERMINATION(#126,#127,.F.,#73,'A7');
C#126=PHYSICAL_DEVICE_PORT(#55,'A7',(#56));
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C#127=PACKAGE_TERMINATION(#71,#77,#128,#83);
C#128=AXIS_PLACEMENT(#129,#130);
C#129=ORIENTATION((1,1,1));
C#130=CARTESIAN_POINT((#131,#82,#82));
C#131=EE_MEASURE(0.6,'inches');
C#132=CONNECTOR_TERMINATION(#133,#49,'ADDR07',#74);
C#133=PACKAGED_PART_TERMINATION(#134,#135,.F.,#73,'A8');
C#134=PHYSICAL_DEVICE_PORT(#55,'A8',(#56));
C#135=PACKAGE_TERMINATION(#71,#77,#136,#83);
C#136=AXIS_PLACEMENT(#137,#138);
C#137=ORIENTATION((1,1,1));
C#138=CARTESIAN_POINT((#139,#82,#82));
C#139=EE_MEASURE(0.7,'inches');
C#140=CONNECTOR_PLACEMENT_RELATIONSHIP(#49,#19,#141);
C#141=AXIS_PLACEMENT(#142,#143);
C#142=ORIENTATION((-1,1,1));
C#143=CARTESIAN_POINT((#144,#145,#146));
C#144=EE_MEASURE(1.5,'inches');
C#145=EE_MEASURE(1.75,'inches');
C#146=EE_MEASURE(5,'inches');
ENDSEC;
END-STEP_WORKING_SESSION;
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:::::::::::  
rqmt.one  
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STEP_WORKING_SESSION;  
HEADER;  
FILE_DESCRIPTION(("Test Case 8a"),' ');  
FILE_NAME('rqmt.one','1994-04-12 10:40:11',(James J. Kachmarsky),(Tobyhanna Army Depot),'  
'dp_sum_86.01','');  
FILE_SCHEMA((Rqmt UoF', 'Util UoF', 'Part UoF', 'Pca UoF', 'Pcb UoF'));  
ENDSEC;  
DATA;  
C#1=EE_DOCUMENT($,#2,(#5),(#6,#7,#8,#9),#4,#10,'MIL-P-55110',#3);  
C#2=EE_APPROVAL('Establish qualification and performance requirements for printed wiring  
boards',#3,T.,#4);  
C#3=ORGANIZATION('US Army Electronic Research and Development Command','ATTN:  
DELET-R, Fort Monmouth, NJ, 07703-5000');  
C#4=DATE();  
C#5=EE_TEXT('Requirement when manufacturing printed wiring boards for military electronic  
products');  
C#6=DATE();  
C#7=DATE();  
C#8=DATE();  
C#9=DATE();  
C#10=ACCESS_CODE();  
C#11=EE_SPECIFICATION($,#2,(#5),(#6,#7,#8,#9),#4,#10,'MIL-P-55110D',#3,$,#3);  
C#12=PROCESS_SPECIFICATION($,#2,(#5),(#6,#7,#8,#9),#4,#10,'MIL-P-55110D',#3,$,#3);  
C#13=DESIGN_REQUIREMENT(#14,#11,$,$,$,$,#19,(#23,#24,#25,#26),#27);  
C#14=DESIGN_SPECIFICATION($,$,(#18),$,#15,$,'DAA07-94-R-0000',#17,$,#16);  
C#15=DATE();  
C#16=ORGANIZATION('Program Offine: Field Airborne Reconnaissance Tracking System','ATTN:  
PO-FARTS, Fort Monmouth, NJ, 07703-5000');  
C#17=PERSON(#16,'Contract Officer','ATTN: PO-FARTS-K');  
C#18=EE_TEXT('New weapon system development');  
C#19=EE_MATERIAL($,'solder',$,$,#20);  
C#20=MATERIAL_SPECIFICATION($,$,(#21),$,#22,$,'QQ-S-571',#3,$,#3);  
C#21=EE_TEXT('Military Approved Solder');  
C#22=DATE();  
I#23=PCB($,$,$,$,$,$,(#13,#66),$,'SM-D-111111',$,$);  
I#24=PCB($,$,$,$,$,$,(#13,#66),$,'SM-D-111211',$,$);  
I#25=PCB($,$,$,$,$,$,(#13,#66),$,'SM-D-111311',$,$);  
I#26=PCB($,$,$,$,$,$,(#13,#66),$,'SM-D-111411',$,$);  
C#27=EE_TEXT('All printed wiring boards must meet MIL-P-55110');  
C#28=DESIGN_REQUIREMENT(#14,#11,$,$,$,$,$,(#23,#24,#25,#26),#27);  
C#29=EE_MATERIAL($,'printed wiring board',$,$,#30);  
C#30=MATERIAL_SPECIFICATION($,$,(#32),$,#31,$,'MIL-P-13949',#3,$,#3);  
C#31=DATE();  
C#32=EE_TEXT('Plastic Sheet',$,'Metal Clad');  
C#33=DESIGN_REQUIREMENT(#14,#11,$,$,$,$,$,(#23,#24,#25,#26),#27);
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C#34=EE_MATERIAL(\$,'Flux, Rosin Base',\$,,\$,#35);
C#35=MATERIAL_SPECIFICATION(\$,\$,(\$#37),\$,#36,\$,'MIL-F-14256',#3,\$,#3);
C#36=DATE0;
C#37=EE_TEXT('Flux for Soldering','Liquid','Rosin Base'));
C#38=PCA(\$,\$,\$,\$,\$,(\$#13,#62,#66),\$,'SM-D-111110',(#12,#14,#20,#30,#35,#44,#54,#82));
C#39=PCA(\$,\$,\$,\$,\$,(\$#13,#62,#66),\$,'SM-D-111210',(#12,#14,#20,#30,#35,#44,#54,#82));
C#40=PCA(\$,\$,\$,\$,\$,(\$#13,#62,#66),\$,'SM-D-111310',(#12,#14,#20,#30,#35,#44,#54,#82));
C#41=PCA(\$,\$,\$,\$,\$,(\$#13,#62,#66),\$,'SM-D-111410',(#12,#14,#20,#30,#35,#44,#54,#82));
C#42=DESIGN_REQUIREMENT(#14,#11,\$,\$,\$,\$,#43,(\$#38,#39,#40,#41),#27);
C#43=EE_MATERIAL(\$,'conformal coating',\$,,\$,#44);
C#44=MATERIAL_SPECIFICATION(\$,\$,(\$#46),\$,#45,\$,'MIL-I-46058',#3,\$,#3);
C#45=DATE0;
C#46=EE_TEXT('Insulating Compound','For coating Printed Circuit Assemblies'));
C#47=EE_DOCUMENT(\$,#48,(\$#51,#52),\$,#50,#53,'MIL-M-38510',#49);
C#48=EE_APPROVAL('Establish requirements for microcircuits',#49,.T.,#50);
C#49=ORGANIZATION('Rome Laboratory','RL/ERSS, Griffiss AFB, NY 13441-5700');
C#50=DATE0;
C#51=EE_TEXT('Requirement when manufacturing Microcircuits for military electronic products'));
C#52=EE_TEXT('Requirement when manufacturing Printed Wiring Assemblies which utilize Microcircuits for military electronic products'));
C#53=ACCESS_CODE0;
C#54=EE_SPECIFICATION(\$,#48,(\$#51,#52),\$,#50,#53,'MIL-M-38510J',#49,\$,#49);
C#55=PACKAGED_PART(\$,\$,\$,\$,\$,\$,\$,'M38510/21001BCX',\$);
C#56=PACKAGED_PART(\$,\$,\$,\$,\$,\$,\$,'M38510/20003BEX',\$);
C#57=PACKAGED_PART(\$,\$,\$,\$,\$,\$,\$,'M38510/00801BEB',\$);
C#58=PACKAGED_PART(\$,\$,\$,\$,\$,\$,\$,'M38510/21003BCX',\$);
C#59=PACKAGED_PART(\$,\$,\$,\$,\$,\$,\$,'M38510/01003BCX',\$);
C#60=PACKAGED_PART(\$,\$,\$,\$,\$,\$,\$,'M38510/22001BEX',\$);
C#61=PACKAGED_PART(\$,\$,\$,\$,\$,\$,\$,'M38510/00403BEB',\$);
C#62=DESIGN_REQUIREMENT(#14,#54,\$,\$,\$,\$,\$,(\$#55,#56,#58,#59,#60,#61),#63);
C#63=EE_TEXT('All microcircuits must meet MIL-M-38510'));
C#64=DESIGN_REQUIREMENT(#14,#54,\$,\$,\$,\$,\$,(\$#38,#39,#40,#41),#65);
C#65=EE_TEXT('All Printed Wiring Assemblies must use MIL-M-38510 Microcircuits'));
C#66=DECOMPOSABLE_REQUIREMENT(#14,#11,\$,\$,\$,\$,\$,(\$#23,#24,#25,#26),#27);
C#67=REQUIREMENT_OCCURRENCE(#13);
C#68=REQUIREMENT_OCCURRENCE(#28);
C#69=REQUIREMENT_OCCURRENCE(#33);
C#70=REQUIREMENT_OCCURRENCE(#42);
C#71=REQUIREMENT_COMPOSITION(#67,#66);
C#72=REQUIREMENT_COMPOSITION(#68,#66);
C#73=REQUIREMENT_COMPOSITION(#69,#66);
C#74=REQUIREMENT_COMPOSITION(#70,#66);
C#75=EE_DOCUMENT(\$,#76,(\$#79),\$,#80,#81,'MIL-C-28809',#77);
C#76=EE_APPROVAL('Specifies requirements for printed circuit assemblies',#77,.T.,#78);
C#77=ORGANIZATION('Space and Naval Warfare Command','ATTN: SPAWAR-003-1212, Washington DC 203630-5100');
C#78=DATE0;
C#79=EE_TEXT('Requirement when manufacturing printed wiring assemblies for military

electronic products''));
C#80=DATE();
C#81=ACCESS_CODE();
C#82=EE_SPECIFICATION(\$,#76,(#79),\$,#80,#81,'MIL-C-28809B',#77,\$,#77);
C#83=DESIGN_REQUIREMENT(\$,#82,\$,\$,\$,\$,\$,#38,#39,#40,#41),#84);
C#84=EE_TEXT('All assembly data must conform to MIL-C-28809B specifications'));
C#85=DESIGN_REQUIREMENT(#14,#82,\$,\$,\$,\$,\$,\$,#55,#56,#57,#58,#59,#60,#61),#86);
C#86=EE_TEXT('All components must be prepared in accordance with MIL-C-28809B
specifications'));
C#87=DESIGN_REQUIREMENT(#14,#82,\$,\$,\$,\$,\$,\$,#23,#24,#25,#26),#88);
C#88=EE_TEXT('All Printed Wiring Boards must have their component terminations spaced in
accordance with MIL-C-28809B specifications'));
ENDSEC;
END-STEP_WORKING_SESSION;

:::::::::::
rqmt.three
:::::::

STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION(("Test Case 8c"),' ');
FILE_NAME('rqmt.three','1994-04-11 15:24:30','(James J. Kachmarsky),(Tobyhanna Army Depot)', ' ','dp_sum_86.01','');
FILE_SCHEMA((Rqmt UoF,'Util UoF','Part UoF'));
ENDSEC;
DATA;
C#1=EE_DOCUMENT(\$,\$,#2,#3),\$,#4,#5,'MIL-M-38510',#6);
C#2=EE_TEXT(('Requirement when manufacturing Microcircuits for military electronic products'));
C#3=EE_TEXT(('Requirement when manufacturing Printed Wiring Assemblies which utilize Microcircuits for military electronic products'));
C#4=DATE();
C#5=ACCESS_CODE();
C#6=ORGANIZATION('Rome Laboratory',\$);
C#7=DESIGN_SPECIFICATION(\$,\$,#2,#3),\$,#4,#5,'MIL-M-38510J',#6,\$,#6);
C#8=PACKAGED_PART(\$,\$,\$,\$,\$,#12),\$,'M38510/01001CEX',\$);
C#9=PACKAGED_PART(\$,\$,\$,\$,\$,#12),\$,'M38510/00401CEX',\$);
C#10=PACKAGED_PART(\$,\$,\$,\$,\$,#12),\$,'M38510/00802CEX',\$);
C#11=PACKAGED_PART(\$,\$,\$,\$,\$,#12),\$,'M38510/21001LEX',\$);
C#12=DESIGN_REQUIREMENT(\$,#7,\$,\$,\$,\$,#13),\$,(#8,#9,#10,#11),#18);
C#13=CHARACTERISTIC('temperature',#14,#17);
C#14=EE_TOLERANCE(#15,#16);
C#15=EE_MEASURE(-55,'celsius');
C#16=EE_MEASURE(125,'celsius');
C#17=EE_MEASURE(25,'celsius');
C#18=EE_TEXT(('Product must operate in a enviromental temperature range from -55 C to +125 C'));
ENDSEC;
END-STEP_WORKING_SESSION;

:::::::::::
rqmt.two
:::::::

STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION(("Test Case 8b"),' ');
FILE_NAME('rqmt.two','1994-04-11 14:09:51',(James J. Kachmarsky),(Tobyhanna Army Depot),'
'dp_sum_86.01','');
FILE_SCHEMA((Rqmt UoF','Util UoF','Part UoF','Pca UoF','Geom UoF'));
ENDSEC;
DATA;
C#1=EE_DOCUMENT(\$,#2,(#5),\$,#4,#6,'MIL-C-28809',#3);
C#2=EE_APPROVAL('Specifies requirements for printed circuit assemblies',#3,.T.,#4);
C#3=ORGANIZATION('Space and Naval Warfare Command','ATTN: SPAWAR-003-1212,
Washington DC 20363-5100');
C#4=DATE0;
C#5=EE_TEXT('Requirement when manufacturing printed wiring assemblies for military
electronic products');
C#6=ACCESS_CODE0;
C#7=DESIGN_SPECIFICATION(\$,#8,(#12),\$,#10,#11,'MIL-C-28809B',#3,\$,#9);
C#8=EE_APPROVAL('New weapon system development',#9,.T.,#10);
C#9=ORGANIZATION('Program Office: Field Airborne Reconnaissance Tracking System','ATTN:
PO-FARTS, Fort Monmouth, NJ, 07703-5000');
C#10=DATE0;
C#11=ACCESS_CODE0;
C#12=EE_TEXT('All printed wiring assemblies must be manufactured in accordance with
MIL-C-28809B');
C#13=PACKAGED_COMPONENT(#14,\$,\$,\$,'U1');
C#14=PACKAGED_PART(\$,\$,\$,\$,\$,(#129),\$,'M38510/21001BCX',\$);
C#15=PACKAGED_COMPONENT(#14,\$,\$,\$,'U2');
C#16=PACKAGED_COMPONENT(#17,\$,\$,\$,'U3');
C#17=PACKAGED_PART(\$,\$,\$,\$,\$,(#129),\$,'M38510/20003BEX',\$);
C#18=PACKAGED_COMPONENT(#17,\$,\$,\$,'U4');
C#19=PACKAGED_PART(\$,\$,\$,\$,\$,(#129),\$,'M38510/00801BEB',\$);
C#20=PACKAGED_COMPONENT(#19,\$,\$,\$,\$,'U5');
C#22=PACKAGED_COMPONENT(#19,\$,\$,\$,\$,'U6');
C#24=PACKAGED_COMPONENT(#19,\$,\$,\$,\$,'U7');
C#25=PACKAGED_COMPONENT(#19,\$,\$,\$,\$,'U8');
C#26=PACKAGED_COMPONENT(#19,\$,\$,\$,\$,'U9');
C#27=PACKAGED_COMPONENT(#19,\$,\$,\$,\$,'U10');
C#28=PACKAGED_COMPONENT(#19,\$,\$,\$,\$,'U11');
C#29=PACKAGED_COMPONENT(#30,\$,\$,\$,\$,'U12');
C#30=PACKAGED_PART(\$,\$,\$,\$,\$,\$,(#129),\$,'M38510/21003BCX',\$);
C#31=PACKAGED_COMPONENT(#30,\$,\$,\$,\$,'U13');
C#32=PACKAGED_COMPONENT(#33,\$,\$,\$,\$,'U14');
C#33=PACKAGED_PART(\$,\$,\$,\$,\$,\$,(#129),\$,'M38510/004/03BEB',\$);
I#34=PACKAGED_PART_TERMINATION(\$,#35,.T.,#19,'ONE');
C#35=PACKAGE_TERMINATION(#36,#52,#54,#55);

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C#36=TERMINAL($,$,$,$,$,$,#38,#45,$,#37);
C#37=EE_MATERIAL($,'Copper Nickel Tin 725 Alloy',$,$,$);
C#38=PCB_CURVE_LOOP(T.,#39,(#42,#43,#44));
C#39=EE_TOLERANCE(#40,#41);
I#40=EE_MEASURE($,$);
I#41=EE_MEASURE($,$);
C#42=CURVE0;
C#43=CURVE0;
C#44=CURVE0;
C#45=PCB_CURVE_LOOP(T.,#46,(#49,#50,#51));
C#46=EE_TOLERANCE(#47,#48);
I#47=EE_MEASURE($,$);
I#48=EE_MEASURE($,$);
C#49=CURVE0;
C#50=CURVE0;
C#51=CURVE0;
C#52=PACKAGE_BODY($,$,$,$,$,$,#53);
C#53=EE_MATERIAL($,'ceramic',$,$,$);
I#54=AXIS_PLACEMENT($,$);
C#55=PACKAGE($,$,$,$,$,$,'DIP 14');
I#56=PACKAGED_PART_TERMINATION($,#57,.F.,#19,'TWO');
C#57=PACKAGE_TERMINATION(#36,#52,#58,#55);
I#58=AXIS_PLACEMENT($,$);
I#59=PACKAGED_PART_TERMINATION($,#60,.F.,#19,'THREE');
C#60=PACKAGE_TERMINATION(#36,#52,#61,#55);
I#61=AXIS_PLACEMENT($,$);
I#62=PACKAGED_PART_TERMINATION($,#63,.F.,#19,'FOUR');
C#63=PACKAGE_TERMINATION(#36,#52,#64,#55);
I#64=AXIS_PLACEMENT($,$);
I#65=PACKAGED_PART_TERMINATION($,#66,$,#19,'FIVE');
C#66=PACKAGE_TERMINATION(#36,#52,#67,#55);
I#67=AXIS_PLACEMENT($,$);
I#68=PACKAGED_PART_TERMINATION($,#69,$,#19,'SIX');
C#69=PACKAGE_TERMINATION(#36,#52,#70,#55);
I#70=AXIS_PLACEMENT($,$);
I#71=PACKAGED_PART_TERMINATION($,$,.F.,#19,'SEVEN');
C#72=PACKAGE_TERMINATION(#36,#52,#73,#55);
I#73=AXIS_PLACEMENT($,$);
I#74=PACKAGED_PART_TERMINATION($,#75,.F.,#19,'EIGHT');
C#75=PACKAGE_TERMINATION(#36,#52,#76,#55);
I#76=AXIS_PLACEMENT($,$);
I#77=PACKAGED_PART_TERMINATION($,#78,.F.,#19,'NINE');
C#78=PACKAGE_TERMINATION(#36,#52,#79,#55);
I#79=AXIS_PLACEMENT($,$);
I#80=PACKAGED_PART_TERMINATION($,#81,$,#19,'TEN');
C#81=PACKAGE_TERMINATION(#36,#52,#82,#55);
I#82=AXIS_PLACEMENT($,$);
I#83=PACKAGED_PART_TERMINATION($,#84,$,#19,'ELEVEN');
C#84=PACKAGE_TERMINATION(#36,#52,#85,#55);
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I#85=AXIS_PLACEMENT($,$);
I#86=PACKAGED_PART_TERMINATION($,#87,.F.,#19,'TEWELVE');
C#87=PACKAGE_TERMINATION(#36,#52,#88,#55);
I#88=AXIS_PLACEMENT($,$);
I#89=PACKAGED_PART_TERMINATION($,#90,.F.,#19,'THIRTEEN');
C#90=PACKAGE_TERMINATION(#36,#52,#91,#55);
I#91=AXIS_PLACEMENT($,$);
I#92=PACKAGED_PART_TERMINATION($,#93,.F.,#19,'FOURTEEN');
C#93=PACKAGE_TERMINATION(#36,#52,#94,#55);
I#94=AXIS_PLACEMENT($,$);
C#95=PACKAGED_COMPONENT_TERMINATION(#18,#34);
C#96=PACKAGED_COMPONENT_TERMINATION(#18,#56);
C#97=PACKAGED_COMPONENT_TERMINATION(#18,#59);
C#98=PACKAGED_COMPONENT_TERMINATION(#18,#62);
C#99=PACKAGED_COMPONENT_TERMINATION(#18,#65);
C#100=PACKAGED_COMPONENT_TERMINATION(#18,#68);
C#101=PACKAGED_COMPONENT_TERMINATION(#18,#71);
C#102=PACKAGED_COMPONENT_TERMINATION(#18,#74);
C#103=PACKAGED_COMPONENT_TERMINATION(#18,#77);
C#104=PACKAGED_COMPONENT_TERMINATION(#18,#80);
C#105=PACKAGED_COMPONENT_TERMINATION(#18,#83);
C#106=PACKAGED_COMPONENT_TERMINATION(#18,#86);
C#107=PACKAGED_COMPONENT_TERMINATION(#18,#89);
C#108=PACKAGED_COMPONENT_TERMINATION(#18,#92);
C#109=COMPONENT_TERMINATION_PASSAGE(.T.,#110,#118,#124,#125);
C#110=DESIGN_LAYER_STRATUM(#113,'Component Side','copper',#111,#112,'conduction');
C#111=EE_TOLERANCE(#112,#112);
I#112=EE_MEASURE($,$);
C#113=PCB_CURVE_LOOP(.T.,#114,(#115,#116,#117));
C#114=EE_TOLERANCE($,$);
C#115=CURVE0;
C#116=CURVE0;
C#117=CURVE0;
C#118=DESIGN_LAYER_STRATUM(#119,'Solder Side','Copper',#111,#112,'conduction');
C#119=PCB_CURVE_LOOP(.T.,#120,(#121,#122,#123));
C#120=EE_TOLERANCE($,$);
C#121=CURVE0;
C#122=CURVE0;
C#123=CURVE0;
C#124=EE_TOLERANCE($,$);
C#125=PCB_CURVE_LOOP(.T.,#126,(#127,#128));
C#126=EE_TOLERANCE($,$);
C#127=CURVE0;
C#128=CURVE0;
C#129=DESIGN_REQUIREMENT($,#7,$,$,$,$,$,#14,#17,#19,#30,#33),#130);
C#130=EE_TEXT('Component Placement','maintain min spacing of 0.005 inches');
C#131=PACKAGING_SPECIFIED_PLACEMENT(#132);
C#132=AXIS_PLACEMENT(#133,#134);
C#133=ORIENTATION((1,1));

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C#134=CARTESIAN_POINT((#135,#135));
C#135=EE_MEASURE(0.25,'inches');
C#136=EE_MEASURE(0.125,'inches');
C#137=PACKAGING_SPECIFIED_PLACEMENT(#138);
C#138=AXIS_PLACEMENT(#133,#139);
C#139=CARTESIAN_POINT((#135,#140));
C#140=EE_MEASURE(0.55,'inches');
C#141=EE_MEASURE(0.975,'inches');
C#142=EE_MEASURE(2.25,'inches');
C#143=EE_MEASURE(4.25,'inches');
C#144=PACKAGING_SPECIFIED_PLACEMENT(#145);
C#145=AXIS_PLACEMENT(#133,#146);
C#146=CARTESIAN_POINT((#135,#141));
C#147=PACKAGING_SPECIFIED_PLACEMENT(#148);
C#148=AXIS_PLACEMENT(#133,#149);
C#149=CARTESIAN_POINT((#142,#135));
C#150=PACKAGING_SPECIFIED_PLACEMENT(#151);
C#151=AXIS_PLACEMENT(#133,#152);
C#152=CARTESIAN_POINT((#142,#140));
C#153=PACKAGING_SPECIFIED_PLACEMENT(#154);
C#154=AXIS_PLACEMENT(#133,#155);
C#155=CARTESIAN_POINT((#142,#141));
C#156=PACKAGING_SPECIFIED_PLACEMENT(#157);
C#157=AXIS_PLACEMENT(#133,#158);
C#158=CARTESIAN_POINT((#143,#135));
C#159=PACKAGING_SPECIFIED_PLACEMENT(#160);
C#160=AXIS_PLACEMENT(#133,#161);
C#161=CARTESIAN_POINT((#143,#140));
C#162=PACKAGING_SPECIFIED_PLACEMENT(#163);
C#163=AXIS_PLACEMENT(#133,#164);
C#164=CARTESIAN_POINT((#143,#141));
C#165=EE_MEASURE(6.25,'inches');
C#166=EE_MEASURE(8.25,'inches');
C#167=PACKAGING_SPECIFIED_PLACEMENT(#168);
C#168=AXIS_PLACEMENT(#133,#169);
C#169=CARTESIAN_POINT((#165,#135));
C#170=PACKAGING_SPECIFIED_PLACEMENT(#171);
C#171=AXIS_PLACEMENT(#133,#172);
C#172=CARTESIAN_POINT((#165,#140));
C#173=PACKAGING_SPECIFIED_PLACEMENT(#174);
C#174=AXIS_PLACEMENT(#133,#175);
C#175=CARTESIAN_POINT((#165,#141));
C#176=PACKAGING_SPECIFIED_PLACEMENT(#177);
C#177=AXIS_PLACEMENT(#133,#178);
C#178=CARTESIAN_POINT((#166,#135));
C#179=PACKAGING_SPECIFIED_PLACEMENT(#180);
C#180=AXIS_PLACEMENT(#133,#181);
C#181=CARTESIAN_POINT((#166,#140));
C#182=PCA($,$,$,$,$,(#129),$,'SM-D-111110',#7);
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C#183=COMPONENT_ASSY_RELATIONSHIP(#131,#182,#13,#184);
C#184=EE_MEASURE(0.01,'inches');
C#185=COMPONENT_ASSY_RELATIONSHIP(#137,#182,#15,#184);
C#186=COMPONENT_ASSY_RELATIONSHIP(#144,#182,#16,#184);
C#187=COMPONENT_ASSY_RELATIONSHIP(#147,#182,#18,#184);
C#188=COMPONENT_ASSY_RELATIONSHIP(#150,#182,#20,#184);
C#189=COMPONENT_ASSY_RELATIONSHIP(#153,#182,#22,#184);
C#190=COMPONENT_ASSY_RELATIONSHIP(#156,#182,#24,#184);
C#191=COMPONENT_ASSY_RELATIONSHIP(#159,#182,#25,#184);
C#192=COMPONENT_ASSY_RELATIONSHIP(#162,#182,#26,#184);
C#193=COMPONENT_ASSY_RELATIONSHIP(#167,#182,#27,#184);
C#194=COMPONENT_ASSY_RELATIONSHIP(#170,#182,#28,#184);
C#195=COMPONENT_ASSY_RELATIONSHIP(#173,#182,#29,#184);
C#196=COMPONENT_ASSY_RELATIONSHIP(#176,#182,#31,#184);
C#197=COMPONENT_ASSY_RELATIONSHIP(#179,#182,#32,#184);
ENDSEC;
END-STEP_WORKING_SESSION;
```

:::::::::::::
util.four
::::::::::::

STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION(("Test Case 9d"),' ');
FILE_NAME('util.four','1994-04-12 11:44:55','(James J. Kachmarsky),(Tobyhanna Army Depot)',
'dp_sum_86.01','');
FILE_SCHEMA((Util UoF,'Rqmt UoF','Part UoF'));
ENDSEC;
DATA;
C#1=EE_MATERIAL((#9,#14),'silicone elastomer',\$,\$,\$);
C#2=EE_MATERIAL((#19,#24),'boron nitride',\$,\$,\$);
C#3=EE_MATERIAL((#29,#34),'silicone and boron composite',\$,\$,\$);
C#4=MATERIAL_COMPOSITION_RELATIONSHIP(#5,'homogeneous ',#6,'#6',#3,#2);
C#5=EE_MEASURE(25,'percent by volume');
C#6=EE_TEXT((?));
C#7=MATERIAL_COMPOSITION_RELATIONSHIP(#8,'homogeneous',#6,'#6',#3,#1);
C#8=EE_MEASURE(75,'percent by volume');
C#9=CHARACTERISTIC('thermal conductivity',#10,#13);
C#10=EE_TOLERANCE(#11,#12);
C#11=EE_MEASURE(4,'Watt/m-K');
C#12=EE_MEASURE(4.25,'Watt/m-K');
C#13=EE_MEASURE(4.125,'Watt/m-K');
C#14=CHARACTERISTIC('thermal impedance',#15,#18);
C#15=EE_TOLERANCE(#16,#17);
C#16=EE_MEASURE(0.25,'deg C-(in)2/Watt');
C#17=EE_MEASURE(0.26,'deg C-(in)2/Watt');
C#18=EE_MEASURE(0.255,'deg C-(in)2/Watt');
C#19=CHARACTERISTIC('thermal conductivity',#20,#23);
C#20=EE_TOLERANCE(#21,#22);
C#21=EE_MEASURE(2,'Watt/m-K');
C#22=EE_MEASURE(2.25,'Watt/m-K');
C#23=EE_MEASURE(2.125,'Watt/m-K');
C#24=CHARACTERISTIC('thermal impedance',#25,#28);
C#25=EE_TOLERANCE(#26,#27);
C#26=EE_MEASURE(0.15,'deg C-(in)2/Watt');
C#27=EE_MEASURE(0.16,'deg C-(in)2/Watt');
C#28=EE_MEASURE(0.155,'deg C-(in)2/Watt');
C#29=CHARACTERISTIC('thermal conductivity',#30,#33);
C#30=EE_TOLERANCE(#31,#32);
C#31=EE_MEASURE(3.4,'Watt/m-K');
C#32=EE_MEASURE(3.6,'Watt/m-K');
C#33=EE_MEASURE(3.5,'Watt/m-K');
C#34=CHARACTERISTIC('thermal impedance',#35,#38);
C#35=EE_TOLERANCE(#36,#37);
C#36=EE_MEASURE(0.19,'deg C-(in)2/Watt');
C#37=EE_MEASURE(0.21,'deg C-(in)2/Watt');

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C#38=EE_MEASURE(0.2,'deg C-(in)2/Watt');
C#39=PCA_PART($,$,#29,#34),$,$,$,#3,'SIL-PAD 2000');
ENDSEC;
END-STEP_WORKING_SESSION;
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:::::::::::::
util.one
::::::::::::

STEP_WORKING_SESSION;
HEADER;
FILE_DESCRIPTION(("Test Case 9a"),' ');
FILE_NAME('util.one','1994-04-11 08:30:49',(James J. Kachmarsky),(\$),' ','dp_sum_86.01',' ');
FILE_SCHEMA('Util UoF','Cmdm UoF'));
ENDSEC;
DATA;
C#1=EE_PRODUCT('FLASHER','double sided/through hole',#2,'AP210AD01'.F.,'assembly');
C#2=ORGANIZATION('Naval Air Warfare Center',\$);
C#3=EE_PRODUCT_DEFINITION(#4,\$,'AP210-000','general',#6,\$,(#7));
C#4=EE_PRODUCT_VERSION(#1,#2,\$,\$,\$,#5,'A',.RELEASED.);
C#5=ACCESS_CODE0;
C#6=DATE0;
C#7=PERSON(#2,'Garland A. Borden III',\$);
C#8=LIBRARY_MODEL(\$,#9,(#11),\$,#12,#13,'Flasher',#2,#14,(\$,#35));
C#9=EE_APPROVAL('Product Verification',#7.,T.,#10);
C#10=DATE0;
C#11=EE_TEXT('Product Verification'));
C#12=DATE0;
C#13=ACCESS_CODE0;
C#14=LANGUAGE_REFERENCE_MANUAL(\$,\$,(#15),\$,#16,#17,'SABER',#18,\$,#18);
C#15=EE_TEXT('SABER Version 2.2'));
C#16=DATE0;
C#17=ACCESS_CODE0;
C#18=ORGANIZATION('ANALOGY Inc.', 'PO Box 1669, Beaverton, OR, 97075-1669');
C#19=CHARACTERISTIC('Supply Voltage',#20,#23);
C#20=EE_TOLERANCE(#21,#22);
C#21=EE_MEASURE(4.5,'volts');
C#22=EE_MEASURE(18,'volts');
C#23=EE_MEASURE(9,'volts');
C#24=CHARACTERISTIC('Output flash ON time',#25,#28);
C#25=EE_TOLERANCE(#26,#27);
C#26=EE_MEASURE(0.5,'seconds');
C#27=EE_MEASURE(0.75,'seconds');
C#28=EE_MEASURE(0.625,'seconds');
C#29=CHARACTERISTIC('Output flash OFF time',#25,#28);
C#30=CHARACTERISTIC('Output Voltage',#31,#34);
C#31=EE_TOLERANCE(#32,#33);
C#32=EE_MEASURE(2.5,'volts');
C#33=EE_MEASURE(16,'volts');
C#34=EE_MEASURE(7,'volts');
C#35=COORDINATED_CHARACTERISTIC((#24,#29,#30),'LAMP Requirements');
ENDSEC;
END-STEP_WORKING_SESSION;

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:::::::::::  
util.three  
:::::::::::  
STEP_WORKING_SESSION;  
HEADER;  
FILE_DESCRIPTION('Test Case 9c',' ');\nFILE_NAME('util.three','1994-04-12 11:03:28','(James J. Kachmarsky)', '(Tobyhanna Army Depot)',  
'dp_sum_86.01',' ');\nFILE_SCHEMA('Util UoF','Rqmt UoF'));  
ENDSEC;  
DATA;  
C#1=MATERIAL_SPECIFICATION($,$,(#2),$,#3,#4,'QQ-S-571',#5,$,#5);  
C#2=EE_TEXT('Military Approved Solder'));  
C#3=DATE();  
C#4=ACCESS_CODE();  
C#5=ORGANIZATION('US Army Electronic Research and Development Command','ATTN:  
DELET-R, Fort Monmouth, NJ, 07703-5000');  
C#6=EE_MATERIAL($,'solder',$,$,#1);  
C#7=PCA($,$,$,$,$,$,$,'AP210EXAMPLE',( #1));  
ENDSEC;  
END-STEP_WORKING_SESSION;
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:::::::::::  
util.two  
:::::::
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STEP_WORKING_SESSION;  
HEADER;  
FILE_DESCRIPTION(("Test Case 9b"),' ');  
FILE_NAME('util.two','1994-04-11 08:36:08',($),("Tobyhanna Army Depot",' ','dp_sum_86.01',' '));  
FILE_SCHEMA(($,'Part UoF','Cmdm UoF'));  
ENDSEC;  
DATA;  
C#1=PACKAGED_PART($,#2,$,$,$,$,$,$,'SE555CN',$);  
C#2=TECHNOLOGY('Bipolar Transistor','Ion Implantation','silicon');  
C#3=PACKAGED_COMPONENT(#1,$,$,$,'U1');  
C#4=PACKAGED_COMPONENT(#1,$,$,$,'U2');  
C#5=LIBRARY_MODEL($,#6,(#9),$,#10,#11,'555',#7,#12,(#28,#36,#42,#51,#59,$,$));  
C#6=EE_APPROVAL('Analog Simulation Model',#7,.T.,#8);  
C#7=ORGANIZATION('Tobyhanna Army Depot','11 Midway Road, ATTN: SDSTO-ME-F,  
Tobyhanna, PA, 18466-5075');  
C#8=DATE();  
C#9=EE_TEXT((???" ));  
C#10=DATE();  
C#11=ACCESS_CODE();  
C#12=LANGUAGE_REFERENCE_MANUAL($,#13,(#16),$,#17,$,'SABER',#14,$,#14);  
C#13=EE_APPROVAL('General Use Analog Simulator ',#14,.T.,#15);  
C#14=ORGANIZATION('ANALOGY Inc.', 'PO Box 1669, Beaverton, OR, 97075-1669');  
C#15=DATE();  
C#16=EE_TEXT('General Purpose Analog Simulator');  
C#17=DATE();  
C#18=CHARACTERISTIC('Supply Voltage',#19,#22);  
C#19=EE_TOLERANCE(#20,#21);  
C#20=EE_MEASURE(4.5,'volts');  
C#21=EE_MEASURE(18,'volts');  
C#22=EE_MEASURE(5,'volts');  
C#23=CHARACTERISTIC('Control voltage',#24,#27);  
C#24=EE_TOLERANCE(#25,#26);  
C#25=EE_MEASURE(2.9,'volts');  
C#26=EE_MEASURE(3.8,'volts');  
C#27=EE_MEASURE(3.33,'volts');  
C#28=COORDINATED_CHARACTERISTIC((#23,#29),'Control voltage at the Test Supply Voltage');  
C#29=CHARACTERISTIC('Test Supply Voltage',#30,#31);  
C#30=EE_TOLERANCE(#31,#31);  
C#31=EE_MEASURE(5,'volts');  
C#32=CHARACTERISTIC('Threshold Voltage',#33,#27);  
C#33=EE_TOLERANCE(#34,#35);  
C#34=EE_MEASURE(2.7,'volts');  
C#35=EE_MEASURE(4,'volts');  
C#36=COORDINATED_CHARACTERISTIC((#32,#29),'Threshold voltage at the Test Supply  
Voltage');
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C#37=CHARACTERISTIC('Trigger voltage',#38,#41);
C#38=EE_TOLERANCE(#39,#40);
C#39=EE_MEASURE(1.42,'volts');
C#40=EE_MEASURE(1.9,'volts');
C#41=EE_MEASURE(1.67,'volts');
C#42=COORDINATED_CHARACTERISTIC((#37,#29),'Trigger voltage at the Test Supply Voltage');
C#43=CHARACTERISTIC('Test Sink current',#44,#45);
C#44=EE_TOLERANCE(#45,#45);
C#45=EE_MEASURE(5,'miliAmps');
C#46=CHARACTERISTIC('Output voltage low state',#47,#50);
C#47=EE_TOLERANCE(#48,#49);
C#48=EE_MEASURE(0,'volts');
C#49=EE_MEASURE(0.2,'volts');
C#50=EE_MEASURE(0.05,'volts');
C#51=COORDINATED_CHARACTERISTIC((#43,#29,#46),'Low voltage at the Test Supply Voltage and Sink Current');
C#52=CHARACTERISTIC('Test source current',#53,#54);
C#53=EE_TOLERANCE(#54,#54);
C#54=EE_MEASURE(100,'miliAmps');
C#55=CHARACTERISTIC('Output voltage high state',#56,#58);
C#56=EE_TOLERANCE(#57,#31);
C#57=EE_MEASURE(3,'volts');
C#58=EE_MEASURE(3.3,'volts');
C#59=COORDINATED_CHARACTERISTIC((#52,#29,#55),'High State voltage at the Test Supply Voltage and Source Current');
C#60=CHARACTERISTIC('Output rise time',#61,#64);
C#61=EE_TOLERANCE(#62,#63);
C#62=EE_MEASURE(0,'nanosecond');
C#63=EE_MEASURE(200,'nanosecond');
C#64=EE_MEASURE(100,'nanosecond');
C#65=CHARACTERISTIC('Output fall time',#66,#64);
C#66=EE_TOLERANCE(#62,#63);
ENDSEC;
END-STEP_WORKING_SESSION;
```